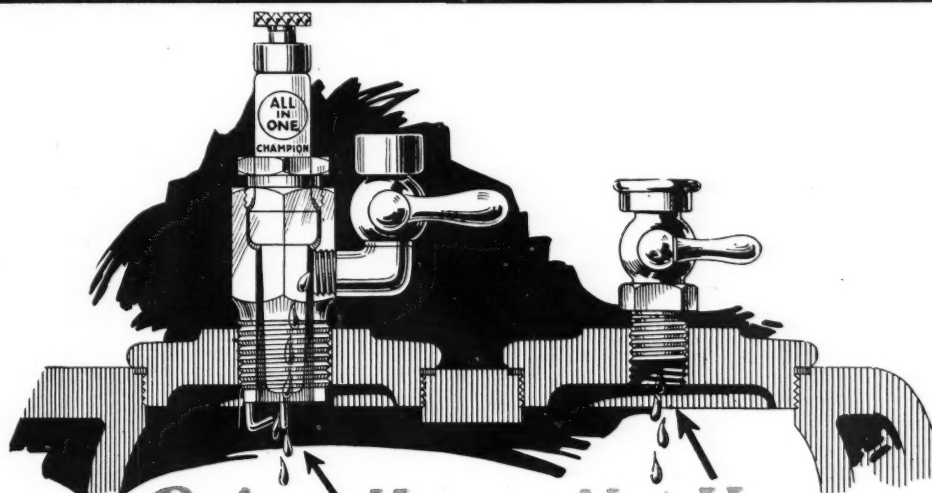


MOTOR AGE

Vol. XXVIII
No. 25

CHICAGO, DECEMBER 16, 1915

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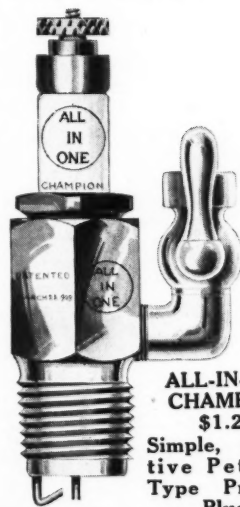
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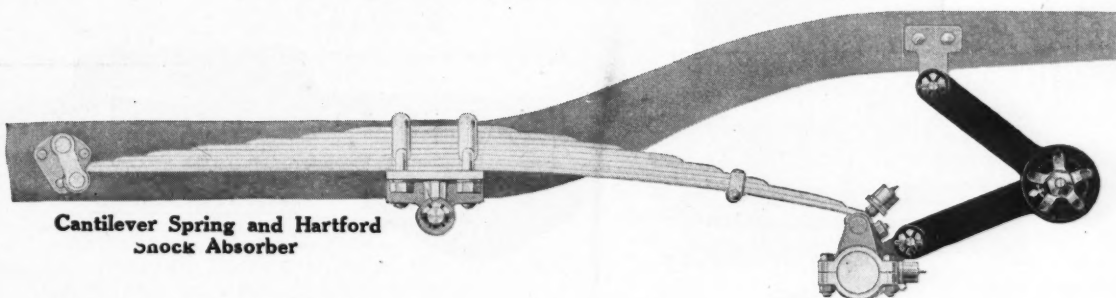
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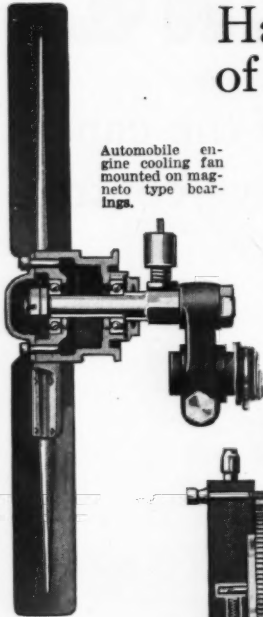
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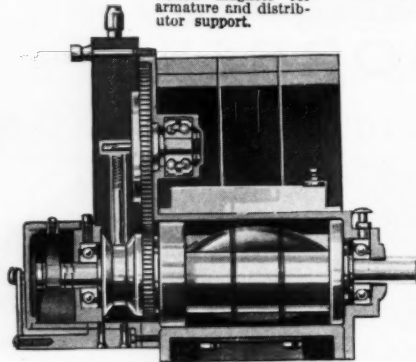
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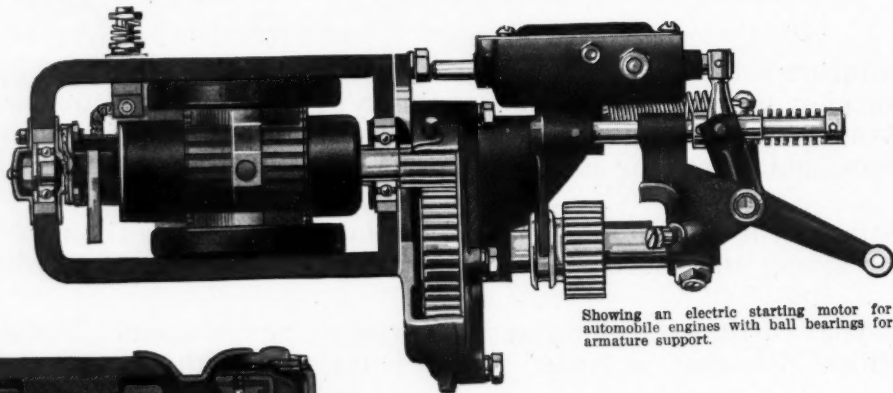
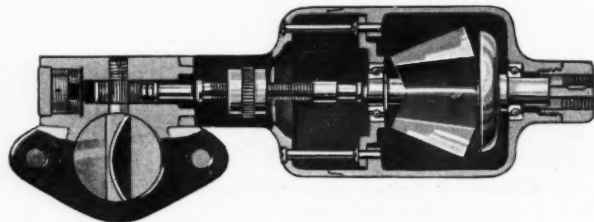
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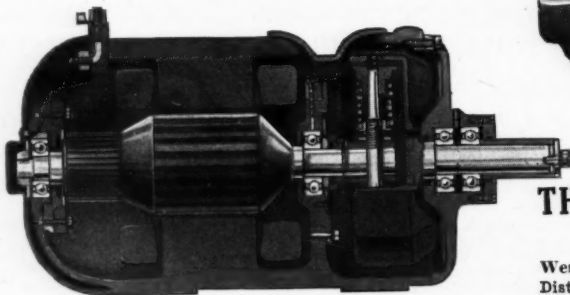
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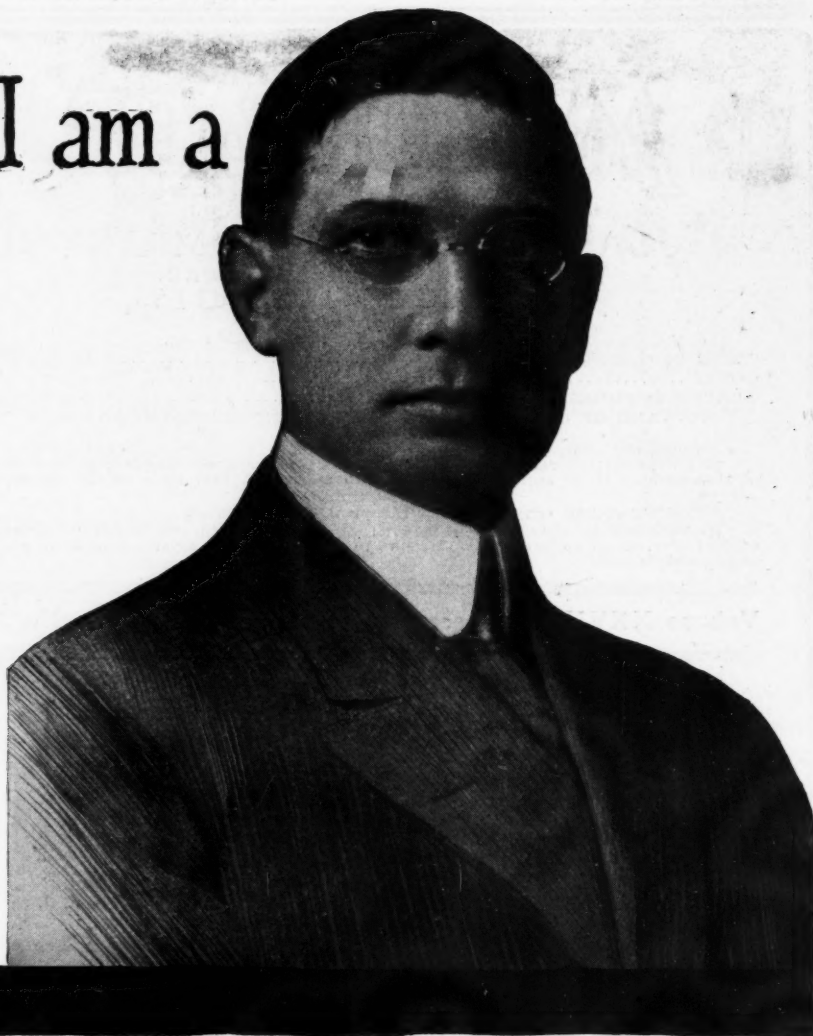
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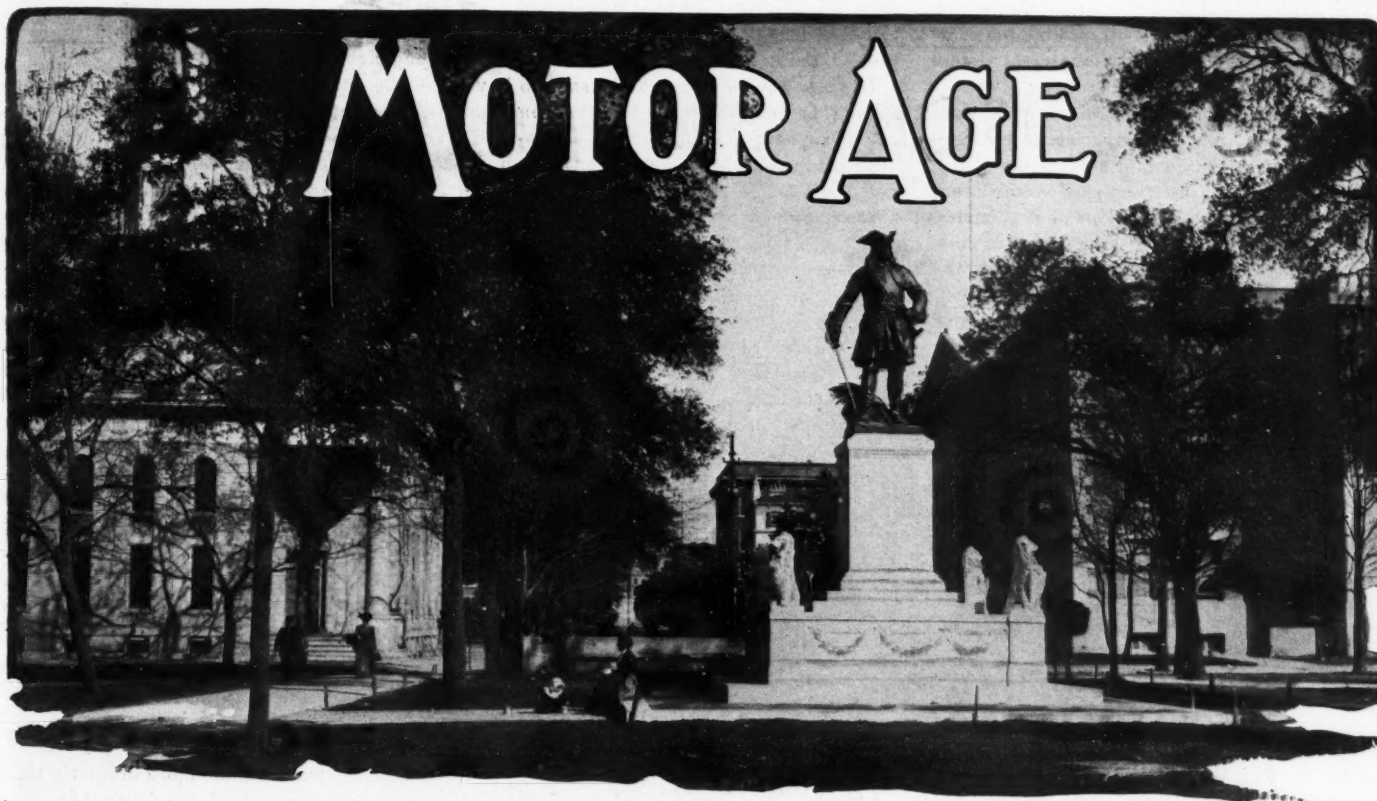
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F. O. B. Detroit



Bronze statue of General James Oglethorpe, who founded Savannah as a philanthropic enterprise

SAVANNAH — the Rich Heritage of Poor Debtors ♣

By J. C. Burton

There is a leader man,
There is a ragtime band,
Down in Savannah,
Down in Savannah,
That plays rag music sweet,
Music, hon, that can't be beat,
Down in Savannah, G.A.
—A favorite of the cabarets.

IRVING BERLIN, Jimmy Monaco, Ted Snyder and all the other rapid-fire rhymers, who write of cotton fields and rice plantations while in the inspiring southern atmosphere of Broadway, New York, have about exhausted the subject of Georgia in their incessant and frenzied efforts to keep the ragtime song mill grinding. For that reason, I approach the theme "Savannah" with a certain amount of fear and trembling. A premonition haunts me that I will be found guilty of redundancy. Moreover, Savannah's story should be written in three-four time and my waltz-meter typewriter is not geared up to that syncopated tempo.

A Missing Monument

Because of the popular song writer's inclination to rhyme Savannah with Hannah and piano, I once held to the opinion that the Georgia seaport was

most famed as the abode of a musical man of Colorado madura complexion who enchanted his lady-love with matchless ragtime melodies. The mistake—for it was a mistake—was natural. Going back over my cabaret experiences, I cannot recall ever having heard a single song that immortalized the brave exploits of James Oglethorpe, John Wesley, George Whitfield, Chief Tomochichi, Count Pulaski, Nathaniel Green, William Jasper

and the other heroes who contributed much to Savannah's early history.

Therefore, when I paid a visit to Savannah recently, I expected to see in the public square a monument erected to the memory of that musical man. As I rode on the train, I chiseled the marble in my mind. It was a most wonderful statue—black hands upon the ivories, head thrown back and eyes rolled in song, and a colored wench leaning enraptured over the top of a baby grand. But the monument was not there. I inspected scores of monuments in the city—tall shafts, great boulders, stone seats and handsome statues—but the one monument that I expected to find was missing.

Savannah Sans Song

Then a great light dawned on me. I realized that the popular song writers did not know as much about Georgia and Savannah as they would have us believe. And thus I was moved to write this story, the story of Savannah as it is and as it was, the story of Savannah without the musical man of the popular song, the story of a city that has the historic and scenic



Boulder marking site of peace meeting between Oglethorpe and Chief Tomochichi

charm of all southern cities and much of the progressiveness of its municipal sisters in the north.

In touring through Dixie, you are tempted to make comparisons between north and south, to find similes for southern cities in the metropolises on the other side of the Mason and Dixon line. Charleston and Boston seem to have much in common. Birmingham is the Pittsburgh of the South. Atlanta is as ambitious and restless as Chicago. Savannah is the New York of the land of cotton, the chief shipping on the South Atlantic seaboard and the financial clearing house for a wide expanse of territory that it dominates.

A Debt We Owe to Debtors

Savannah's growth in nine score and two years is most remarkable. A colony of 134 English debtors in 1733, it is now a prosperous city of 100,000 inhabitants. In England, the original settlers of Savannah were regarded as social deficits; in America, where they were shipped like the

ticket-of-leave men of Australia, they proved themselves rich assets.

In fact, Savannah might be said to have sprung from jail stock, but Savannah is not ashamed of its ancestry. The descendants of the first families of Savannah do not boast of how much money their forbears had, but how much they owed. The men and women who sailed to America with James Oglethorpe, warrior and philanthropist, were members of the Awful Poor, not the Awful Rich. They were in debt to the butcher, the baker and the candlestick maker and had been cast into prison for their inability to meet their obligations, for living beyond one's means, and dodging the bill collector was an offense almost as heinous as second-story work and pocket-picking across the Atlantic two centuries ago. To display an empty wallet in court was to sentence yourself to the municipal rock pile. Probably all records for breaking big rocks into little ones were shattered during the days fol-

lowing Christmas in ye good old times of long ago.

The social outcasts of England, financially impoverished and liberated from debtors' cells to extend the domain of King James across the Atlantic, and their immediate descendants may have had the prison brand upon them, but they were men of courage, nevertheless. In the early days of the colony, when the guns of Spanish invaders boomed a demand for entrance and surrender at the very gates of the settlement, Savannah's defenders twice routed the Castilians. Less than a half a century later, Savannah was just as loyal to the cause of the American colonies, fighting for independence, as it had been to the mother country, engaged in a war for possession of a new world empire. Attacked by Lord Howe's fleet and captured by the British in 1778, the patriots of Savannah gave their blood in futile and desperate attempts to retake the city and replace the standard of Great Britain, flying from the flag staff on the custom house, with the banner of thirteen stars and thirteen stripes.

A City of Monuments

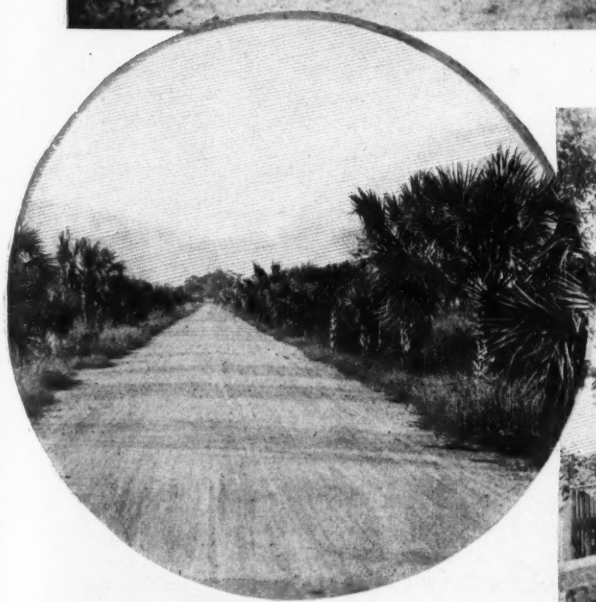
Because war is much more dramatic than peace and the call of the bugle far more inspiring than the ring of sledge on anvil, the war chapters are the most interesting pages in Savannah's history and the monuments, erected in honor of her military heroes, have the greatest appeal of all the attractions that the city has to offer the sight-seeing tourist.

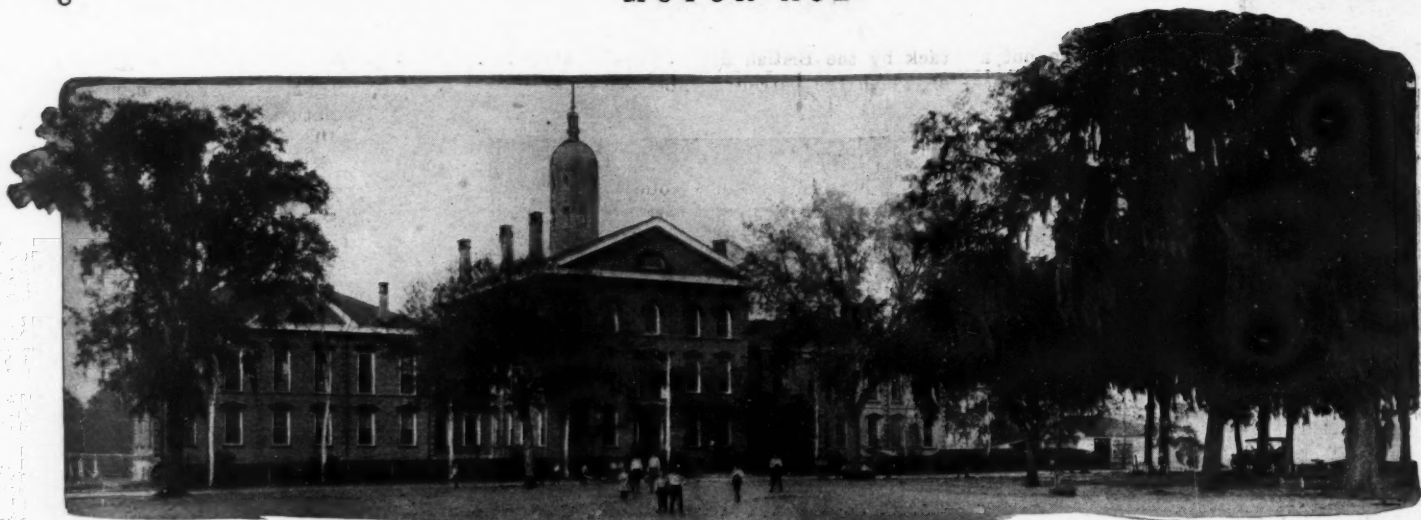
Ride or walk down Bull street, the main thoroughfare of Savannah, and an episode in the city's history is recalled to you at the end of every block, for Bull street



Negro cabins and old mansion at the Hermitage, an ante-bellum plantation three miles from Savannah

Some of the Picturesque Highways in the Vicinity of Savannah





Bethesda orphanage for boys, founded in 1740 by Rev. George Whitfield

is a succession of alternate lanes of traffic and small parks or squares, each of the latter having a monument to commemorate some hero of the past, whose body is dust, but whose achievements are immortal.

At the foot of Bull street, in the long park that extends along the river front, is a stone bench. Here, 182 years ago, James Oglethorpe gathered his band of debtors about him and took possession of the land in the name of the English king. Several blocks down the street is a bronze statue of the founder of Savannah, a cocked hat on his bewigged head, his body protected by a skirted coat, great-boots wrinkled about his legs and a sword held in one of his gauntlet-covered hands.

Boulder Marks Peace Meeting Site

In another square on Bull street, close to the Oglethorpe statue and nearby the postoffice and county building, is a huge boulder of granite, perpetuating the name of Chief Tomochichi and marking the spot where the 91-year-old leader of the Creeks pledged his friendship to the English settlers, who had crossed the Atlantic in a "winged canoe." At the peace meeting of the redskin and the paleface, Tomochichi, presenting to Oglethorpe a buffalo robe ornamented with a picture of an eagle, said:

"The eagle is an emblem of speed, and the buffalo of strength. The English are as swift as the bird, for they fly over vast seas, and, like the buffalo, they are so strong nothing can withstand them. The feathers of the bird are soft, and signify love; the buffalo's skin is warm, and signifies protection. Therefore, love and protect our little families."

After listening to this flattering speech, Oglethorpe probably decided then and there to call the adjacent trail Bull street, although it is writ in the history of the city that the thoroughfare was named for Stephen Bull, an English planter, who came to America and settled on a nearby island shortly before Savannah was founded.

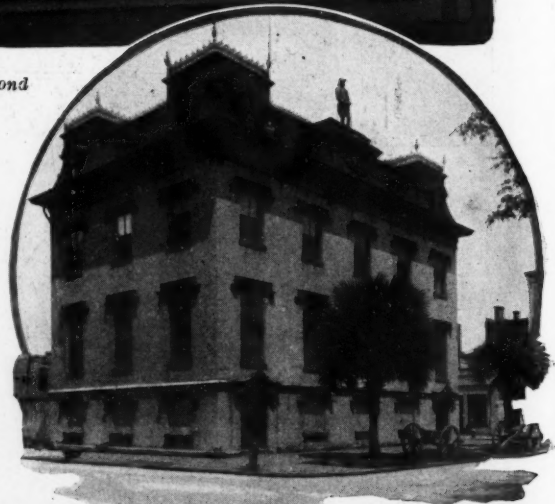
There are also two monuments in squares on Bull street which had their cornerstones



Savannah theater, built in 1811, and the second oldest playhouse in the United States

laid by no less a personage than Marquis LaFayette, who visited Savannah in 1825 to dedicate the memorials of Count Pulaski, the Polish general, and Sergeant William Jasper, one of the most romantic heroes of the Revolutionary war, both of whom were killed in an unsuccessful attempt to drive the British out of the city in 1779.

The marble tribute to Pulaski is the tallest shaft in the city of magnificent memorials while the statue of Sergeant Jasper, sculptured with the flag in his hand as he held it at the siege of Savannah and flaunted it in the face of an enemy that had shot it down, is the only monument that ever has been erected to the memory of a non-commissioned officer of the Revolution. Except to close students of United States' history, the deeds of Sergeant Jasper are little known. He was a fighter if there ever was one. He gave odds to the enemy and routed them. He was a soldier who



Barracks of the Chatham artillery with guns in front of armory, which were presented to the corps by George Washington in 1792

asked no other reward than the sight of a retreating foe. When he was offered a lieutenant's commission by Governor Rutledge of South Carolina, after he had rescued the flag in the attack on Fort Moultrie, Jasper declined, saying: "I am not

fit to keep officers' company, I am but a sergeant."

Nathaniel Greene, the fighting Quaker and one of the ablest generals on George Washington's staff, is another of Savannah's heroes whose fame has been perpetuated by the erection of a monument in a square on Bull street. The remains of this tenacious warrior, who pursued Cornwallis and his redcoats through the south like a hornet, lie in a vault under the shaft of marble, having been removed from a sepulchre in the old colonial cemetery at the corner of Oglethorpe avenue and Abercorn street when the memorial was built. Although not a Georgian by birth, Greene spent his last days at Mulberry Grove, a plantation on the Savannah river, 14 miles above the city, where he died in 1786 as a result of a sunstroke.

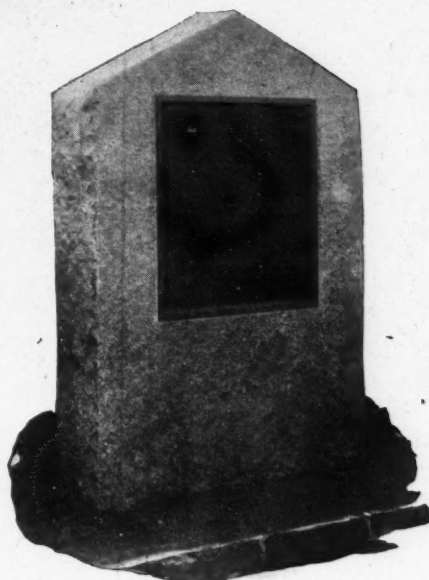
Whitney Tutor to Greene's Children

Mulberry Grove is worthy of a short paragraph of intrusion. The estate was Georgia's gift of gratitude to Greene for the part he played in the war of independence. It was here that Eli Whitney, inventor of the cotton gin, which was destined to revolutionize the cotton industry of the world, was employed as a tutor for the children of the revolutionary general.

Whitney's old home, by the way, is one of Savannah's historic attractions. It stands just across the street from St. John's church and now is owned by P. W. Meldrin.

At the corner of Whittiker and Broughton streets is Tondee's old tavern, a landmark of the stirring days of the American revolution. In the long room of the ancient public house, the Sons of Liberty gathered to smoke their long clay pipes, drink their ale, protest against the stamp act, organize the first provincial congress and plan the defense of Savannah against at-

tack by the British fleet. The old table, at which the patriots deliberated, can be seen there. The old chairs, from which they rose to make impassioned speeches against King George, have not fallen into the hands of antique collectors. Tondee's tavern is a place where history was



Stone tablet marking spot where Jasper and Pulaski were killed in attempt to take Savannah from British

made over the pewter mugs and in the blue smoke of tobacco.

The old colonial cemetery, shaded by great oaks, is the last resting place of several heroes who drew their swords in the defense of American independence or courted hanging by participation in the councils of the thirteen colonies. Here is the vault of Nathaniel Greene, where the remains of the Revolutionary general rested for 114 years, and the graves of

James Habersham, who came to America with Oglethorpe; Major J. Berrien, an officer in the Revolution; General Lachlan McIntosh, who killed Button Gwinnett, one of the signers of the Declaration of Independence, in a duel in 1777; Lieutenant Cottineau, who served under John Paul Jones; Archibald Bullock, the first president of Georgia and an ancestor of Theodore Roosevelt; and Edward Malbone, a noted painter of miniatures.

Cemetery Once a Plantation

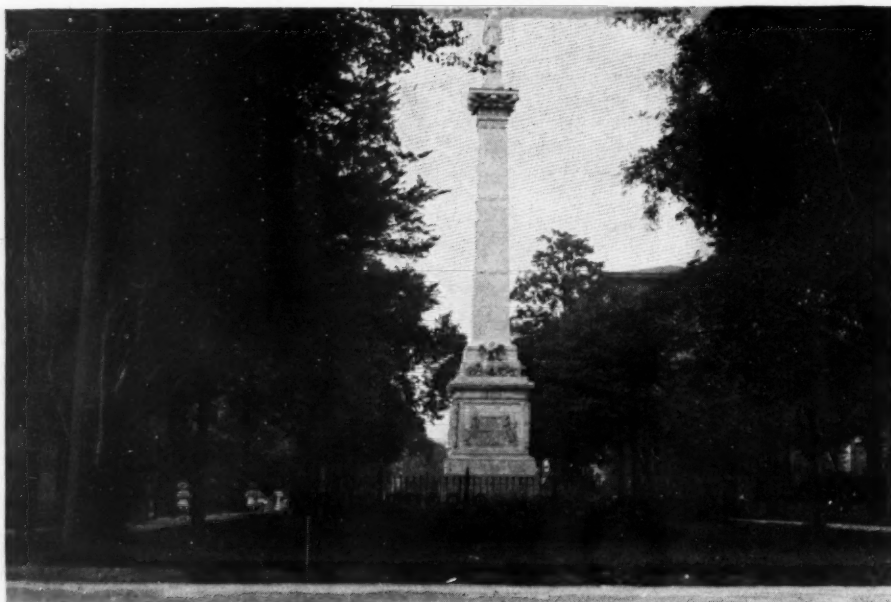
Savannah has another picturesque cemetery, the history of which is not written alone on its gravestones. It is called Bonaventure and is famed for its scenic entrancement, for its winding drives that are arched by the sturdy limbs and dense foliage of stately oaks, centuries old and pendant with Spanish moss. The magnificent burial ground on the banks of the Wilmington once was a more lively place than it is today. At the outbreak of the Revolution, it was the plantation of Colonel John Mulryne, a prominent Royalist, and the refuge of the Tories. It was to Bonaventure that Sir James Wright, the last colonial governor of Georgia, went when he escaped from the jail in which the Sons of Liberty had imprisoned him. Bonaventure is the birthplace and the burial place of Josiah Tattnall, who first declared "Blood is thicker than water" and who served in the United States' navy before the Civil War and then as a commander of a Confederate fleet.

In the old Jewish burial ground on Gerard street, near the Union station, is a tomb that bears the date of 1797. It holds the coffin of Mordecai Sheftal, who came to the colony in 1733 and acted as one of Oglethorpe's advisers.

Savannah, city of warriors, was far from dominated by the flintlock and the



Old house on Bull street where General Sherman made his headquarters after march to the sea



Marble shaft erected to memory of Count Pulaski, Polish general who was killed in siege of Savannah

saber in her early days. The Bible and hymn book played a prominent part in the development of Oglethorpe's colony as the refuge of the debtor attracted to it in 1736 John Wesley, leader of the greatest religious movement of the eighteenth century; Charles Wesley, his brother and the most popular hymnist of the age; and George Whitfield, pronounced the most brilliant preacher of his generation.

On the custom house, at the corner of Bull and Bay streets, is a bronze tablet marking the place where John Wesley preached his first sermon. Here also, the famous Protestant divine established the first Sunday school in the world. Ten miles south of Savannah is the Bethesda orphanage for boys, the oldest organized charity in America. It was founded in 1740 by Rev. George Whitfield, who made the institution famous in England and New England in the eighteenth century by his impassioned appeals for aid, and the first public road in Georgia was cut through the virgin forest to the doors of the orphanage.

Ask Sherman to Spare Bells

Like many other southern cities, Savannah has several old churches, the most historical of which is the Independent Presbyterian church with a tall steeple that towers far above the tops of the great oaks and cedars that line Bull street. It was in 1864 that the most dramatic episode in the annals of this edifice occurred. Sherman had burned Atlanta. He was marching on to the sea, leaving in his wake a trail of fire and ashes. As the northern general entered Savannah, he was met by the feminine members of the congregation, clothed in white robes of supplicants before a conqueror, who asked him to spare the bells, which they feared he would cast into bullets.

The house where Sherman made his headquarters while in Savannah stands on Bull

street. It is a brick structure, painted yellow and featured by tall English windows. As you pass by the place you picture the civil war general on the porch or walking in the garden among the stately trees and fragrant shrubbery, meditating on the waste and sorrow that he has caused and repeating to himself, over and over again, "War is hell."

War Relics on Golf Links

Savannah's civil war landmarks, however, are few. You will find some, nevertheless, at a place where you would last look for such things, on the eighteen-hole course of the Savannah Golf Club. The breastworks, which were thrown up by the Confederates on the approach of Sherman, are now used as bunkers and the player, who knows his history and drives into them, probably murmurs "Damn those Yanks" whenever he tears up

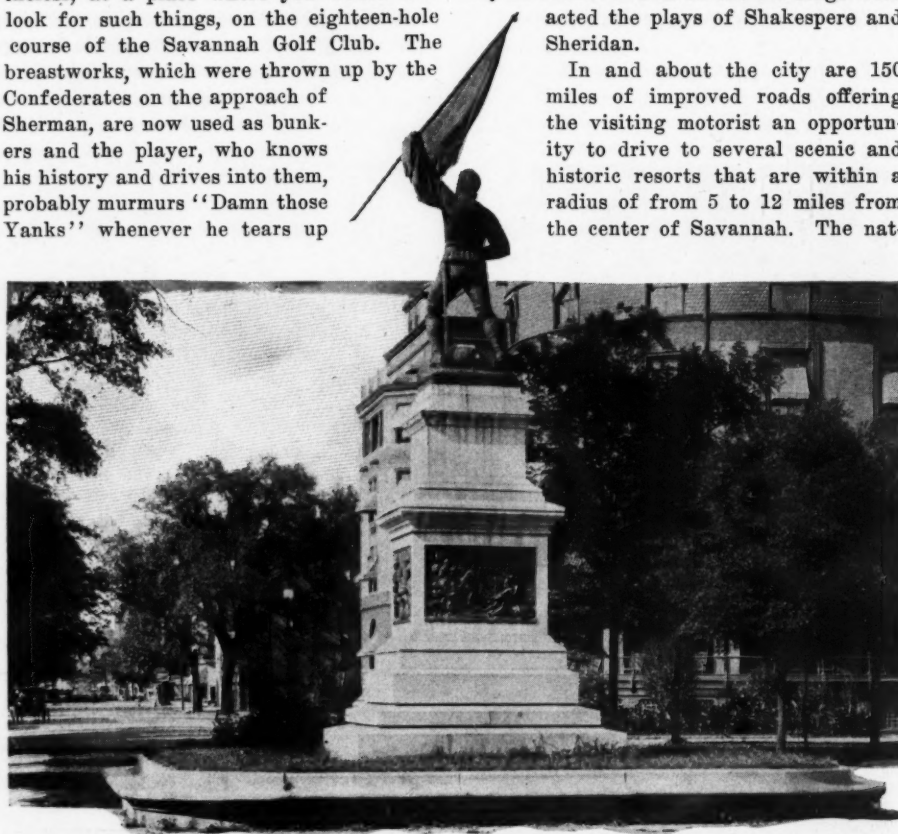
the turf with his niblick in a futile attempt to get out of a bad lie.

Although it cannot boast of as many and as picturesque old houses as Charleston, Savannah has several residences that have legends connected with them. On West Broad street is the Scarborough house. At the dawn of the nineteenth century, William Scarborough, the owner of the first steamboat to cross the Atlantic, lived here and 20 years before the epochal day when the "Savannah" left a cloud of smoke in its wake as it steamed out of the harbor, George Washington was entertained in the old dwelling. The Scarborough house now is a school for colored children who learn their A, B, C's in the very room when the father of his country was introduced to the first families of Savannah and where Scarborough and his partner, Isaacs, made plans for the maiden trip of their then novel craft.

Theater More Than Century Old

The second oldest theater, with a cornerstone laid in 1811, is located in Savannah. A half century ago, Joseph Jefferson was manager of this playhouse and brought the most talented of actors and actresses to the seaport city for performances. When the theater was built, the arrival of the troupe was something of a gala event and brought the merchants out of their stores to see the mimes pass by in rumbling stagecoaches, on the baggage racks of which were piled the trunks, the scenery and the properties, Hamlet's skull, Richard's sword and Caesar's throne. The old playhouse was the shrine of tragedy and comedy in the south and on the old stage were acted the plays of Shakespeare and Sheridan.

In and about the city are 150 miles of improved roads offering the visiting motorist an opportunity to drive to several scenic and historic resorts that are within a radius of from 5 to 12 miles from the center of Savannah. The nat-



The Sergeant Jasper monument, the cornerstone of which was laid in 1825 by La Fayette

ural beauty of these highways, arched by live oaks stately pines and redolent magnolias from which hang festoons of gray Spanish moss, is something that is better pictured by artist's brush than writer's pen.

Thunderbolt, a resort 5 miles from Savannah, received its name from the Indians who ascribe the creation of the spring there to a freak of nature. According to the redskin legend, the place was struck by lightning and sulphur water gushed forth from the ground. During the civil war, a line of trenches was made here to defend the Wilmington river from attack by Yankee gunboats and one of the four Columbiads, sent south for coast defense and recovered from the Savannah river, where it fell during Hondee's retreat across pontoon bridges on the approach of Sherman, is mounted on the grounds.

At Jasper's Springs, a drive of 2 miles, is Sergeant Jasper's old cabin. It is constructed of tabby and stands on six pillars. Sherman passed it on his march to the sea but spared the Revolutionary war relic from the torch because of its historic associations.

A drive of 3 miles takes the tourist to the Hermitage, a plantation of the antebellum days, where the old mansion and slave dwellings can be inspected. The estate was settled in 1783 and the family of the present owner, Judge McAlpin, has lived there since 1819.

Beaulieu, another old estate 12 miles from Savannah, is beautifully situated on a bluff above the Vernon river about 7 miles from the ocean. It is composed entirely of winter and summer residences and is extremely attractive to homeseekers and tourists. It was originally a plantation of 500 acres, owned by William Stephens, president of the colonial council, the grant being confirmed by Oglethorpe in 1738. It was named after the Duke of Montagu's manor in England. Beaulieu was rendered memorable by the debarkation of Count d'Estaing's troops in September, 1779, for the siege of Savannah, and also by the erection of formidable batteries during the civil war for the protection of the city.

800 VOTERS, BUT 1,000 CARS

Sonora, Tex., Dec. 14—It is claimed that the county of Sutton, of which Sonora is the county seat, has more motor cars per capita to its population than any political subdivision in the United States. The voting strength of the county is approximately 800 and the number of motor cars that are registered in the office of County Clerk Sam Stokes is close to 1,000. This record is all the more remarkable in view of the fact that the county has no railroad within its borders and that Sonora is about 60 miles from the nearest outside railroad point. Further, the county is in a remote part of western Texas where ranching is the chief vocation.

Draft Federal Aid Bill

State Highway Officials Will
Ask Congress for
\$25,000,000

Measure Provides for Placing Funds
With Secretary of Agriculture

COLUMBUS, O., Dec. 15—Through the Ohio Good Roads Federation announcement is made of the details of the plans for Federal aid to the states in road construction. It is the plan that is to be submitted to Congress at its session, which began December 7, and calls for an annual appropriation of \$25,000,000 to be distributed under the provisions of a bill drafted by the American Association of State Highway Officials.

Wilson Favorable to Bill

The claim is made by those who have had a share in the work that there have been assurances of strong support for the measure, either in the present or in slightly amended form. The initial appropriation may not be as large as \$25,000,000 but it is said that it is indicated that it will be substantial. Reliance is placed on an incident in connection with the framing of the measure as indicating the possible position of President Woodrow Wilson in connection with the bill.

Of the committee which whipped the

proposal into shape, a conspicuous member is Colonel E. A. Stevens, of New Jersey, who was appointed state highway commissioner by President Wilson when the latter was governor of New Jersey. Colonel Stevens first delayed giving final sanction to the act because, he said, he did not wish to take any position that might not be in harmony with the wishes of the president. The fact of his later approval is held to be significant.

There are also said to be assurances that the Ohio delegation in Congress will be friendly. Out of a former appropriation of \$500,000 by the federal government, Ohio received \$120,000 for improvement of the old National pike because it was one of the few states which were ready to participate in the provisions of the appropriation.

The provisions of the new bill place the distribution of the funds in the hands of the secretary of agriculture, co-operating with the office of public roads. The expressed object is the improvement of military and post roads used in interstate commerce. The general plan of distribution is as follows:

"One-third in the ratio which the area of each state bears to the total area of all the states; one-third in the ratio which the population of each state bears to the total population of all the states, as shown by the Federal census, and one-third in the ratio which the mileage of rural post roads of each state bears to the total mileage of rural post roads as shown by the latest available report by the postmaster general."

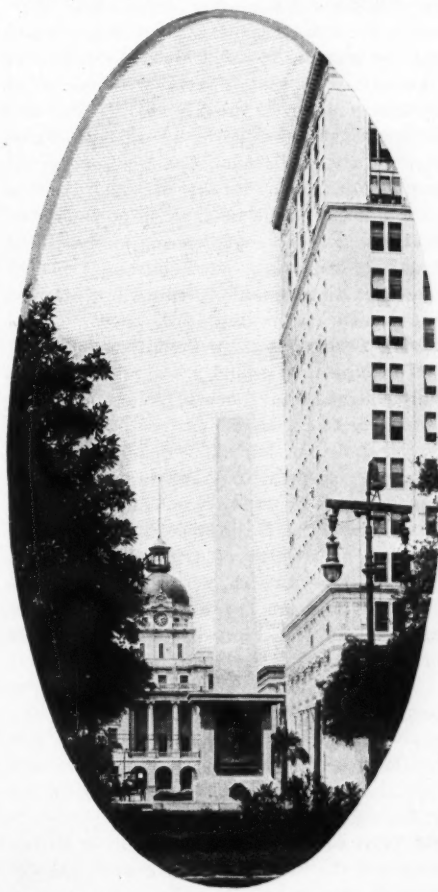
States Must Vote Money

It is provided expressly that only those states that have highway departments of prescribed standards are to share in the distribution, but the states which are delinquent are given 3 years in which to prepare. If any state does not avail itself of its opportunities, the funds will revert to the principal fund for reapportionment among the remaining states. Five per cent is set aside for administration.

The distribution is to be made upon petition from state highway departments in which the roadways to be improved are set out in detail. In no case is the federal government to contribute more than \$10,000 a mile and is not to pay more than 50 per cent, the state being required to put up at least as much as the federal government. The federal authorities have general supervisory powers over the work which is to be done under the principal direction of the state departments.

JITNEY DRIVERS "GOOD FELLOWS"

Topeka, Kan., Dec. 15 — Fifty jitney drivers of this city, have offered their cars and services to the Goodfellows on Christmas day to deliver bundles and boxes of food, clothing and toys to poverty-stricken families throughout the city. The drivers, of course, won't receive a jitney for their day's work.



Monument and vault of General Nathaniel Greene, the Revolutionary commander

Army Sanctions Motor Reserve Corps

Plans Outlined by War Chiefs Call for Twenty-seven Cars to Each Company

WASHINGTON, D. C., Dec. 15—The motor reserve corps movement, being promoted by Motor Print magazine, has received recognition from the war department. The plan of organization of a motor reserve corps company was described by Lieutenant Colonel Chauncey B. Baker, the army transportation expert, in a conference to which had been invited G. T. Bindbeutel, editor of Motor Print, and H. D. Brandyce, editor of the Automobile Blue Book. The conference was at the direction of Brigadier General A. L. Mills, chief of the division of militia affairs.

It is said that a number of cities can now proceed with their organization of motor reserve corps which will be acceptable to the government. The formation of a volunteer motor car company has been given thorough study by Colonel Baker whose report, not ready for publication until approved by the general staff, covers many pages of typewritten copy.

Twenty-seven Cars to Company

The plan calls for twenty-seven cars to each company and twenty-eight drivers, one an emergency pilot. These drivers are described as chauffeurs to distinguish them from wagon train drivers. A chauffeur will have the rank of a sergeant. Each motor car company will be under the command of a first class sergeant with the title of car master. There will be three assistant car masters, sergeants; one machinist, sergeant; one helper, private; one cook; one watchman, private; and one trumpeter, private. Each company is also to have one wrecking car and five motorcycles.

In the report of the study of a motor reserve corps company by Colonel Baker is a full statement of the duties of the chauffeur. This is so minute in its details as to specify the time when grease cups are to be turned, when brakes and tires are to be tested, when the storage battery is to be given attention—in fact, a program has been drawn up which would convert an ordinary motorist into a very cautious, well-trained driver in a short time. One of the principal provisions, which is emphasized by strong language and many paragraphs of repetition, is against over-loading.

There would be one or more motor car companies to a regular army division consisting, for instance, of nine regiments of infantry, one regiment of cavalry, two regiments of field artillery, one battalion of engineers, one battalion of the signal corps and the hospital and ambulance equipment.

Accompanying an army in campaign also will be a complete field repair shop. These shops will be in charge of officers who have

spent some time in the leading American motor car factories. It is understood that a great many officers are now being so trained. Just how many, Colonel Baker would not say, although he admitted that the plan would be given a fairly extensive trial.

During the conference a sergeant reported to Colonel Baker, advising that he had just finished his 3 months' course with the White Co., in Cleveland. Colonel Baker asked him for recommendations. The sergeant, who is French by birth, said:

"The experience was very valuable. I think, however, that we should spend 6 months instead of 3 months in these factories. I was kept on a job in the White plant until I had mastered the process. Then I was moved to another department. While I am completely instructed as to the construction of a car, I am sure that there would have been more benefits if I had had just twice as much time."

In the event that the motor reserve corps is not fully organized all over this nation, the government has a substitute plan for the chartering of cars and trucks from factories and large concerns having many cars and trucks in service. This plan embraces the enlistment of experienced drivers. A form of contract has been drawn up, by the terms of which the lessee of the car or truck would receive so many dollars a day for the hire of the car and so much extra depending on mileage. These figures are in Colonel Baker's report but cannot be given out at present. In the contract the value of the car is stipulated and the government agrees to keep the truck in first-class condition and, in the event of an accident, to reimburse the lessee for the full value as agreed.

Motor Truck Company Organization

The organization of a motor truck company, already in the military regulations, is similar to the motor car company. There is the same number of vehicles and chauffeurs and car masters; and the same ranking, excepting that two machinists are named, who are corporals. In addition, the regulations require no trumpeter but specify two oilers which, according to Colonel Baker, have been found to be unnecessary and probably will be discontinued at the next change of the regulation.

The motor car companies in the reserve corps are principally intended for the transportation of troops. It will be left to the truck companies to transport ammunition, food and supplies of clothing and incidentals.

"That is, the trucks will deliver to the wagon train, which will in every case deliver to the army on the firing line," said Colonel Baker. "Ordinarily a truck

should not approach closer than a 1½ day's journey to what we call the line of kitchens. Occasionally when the army is on the march the trucks may come as near as a half day. But armies, you know, spread out over corn fields and swamps and hills off of roads, where a heavily-laden truck cannot proceed with the same success as a horse-drawn wagon."

Colonel Baker said that the use of motor cars of all descriptions for the transportation of troops was proved with vehemence when the Germans were marching on Paris in 1914. He said that it was only by the use of motor cars that General Gallieni was able to dispatch troops from Paris so swiftly to certain points as to thwart the advance of the invaders. Colonel Baker said that the great value of the motor reserve corps would be in concentrating and mobilizing troops—in the event of war, moving great masses of troops to new positions over night.

Note of Encouragement

Brigadier General Mills in a statement to Mr. Bindbeutel just before the conference today said: "It is encouraging to know that you have been able to get promising responses in your work and I can assure you all possible encouragement will be extended to you by this office. In as much as the transportation facilities of the organized militia are now in great part lacking, so far as divisional trains are concerned, the war department will be very glad to see the states organize and maintain their proper components. Of course, the organization of such units is entirely a matter to be taken up by the states concerned; such organizations being part of the organized militia would participate in federal assistance just as is the case with infantry or other units."

TEACHING SOLDIERS TO DRIVE

New York, Dec. 15—Motor car preparedness has now been taken up by the United States army, and a school for training soldiers to be chauffeurs of scout cars and supply trucks has been started in this city. Men from Forts Jay, Wadsworth, Totten, Hamilton, Wood and Schuyler will after the first of the year begin to study the intricacies of the motor car engine, self-starters, batteries, lighting systems and other mechanical parts of the car.

The new school was started under the direction of Captain Gordon Johnston, Eleventh cavalry, aide-de-camp to General Wood. Because it would be impossible to open separate schools at each of the posts, with an equipment of cars and machinery, for which there is no money available, arrangements have been made with the motor school of the West Side Young Men's Christian Association, 318 West Fifty-seventh street, to teach the men to run and repair the car. A fleet of twelve passenger cars and a 5-ton Mack truck will be used.

When the soldiers have completed the course and received certificates they will

be eligible for appointment as chauffeur sergeants.

At the Thursday night's meeting of the Metropolitan section of the S. A. E., Captain Johnston will speak on "What the S. A. E. Can Do for the U. S. Army."

MOTOR TRAIN FOR NATIONAL GUARD

New York, Dec. 15—When the New York National Guard goes to its annual maneuvers next summer, it will have with it a thoroughly up-to-date armored motor truck train. It is expected that the train will cost close to \$1,500,000, the money for which is being raised by several public-spirited New York millionaires. Governor Whitman of New York last week approved an appropriation for \$10,000 to keep the unit in commission.

Those behind the presentation of the new unit are the same men who were responsible for the motor truck train which accompanied the students of the preparedness camp at Plattsburg, N. Y., last summer and which proved such a big success.

The number of battle cars the first train will contain has not been decided, although it is practically certain that one will be a 2-ton truck, fully armored and carrying machine guns, and several 3-pounders.

MOTORISTS MUST LOCK CARS

Detroit, Mich., Dec. 15—An ordinance has been passed by the city council whereby all passenger cars and motor trucks of a capacity under 1,500 pounds must be provided with locks and be locked when they are left unguarded or unattended in the streets. One of the principal reasons for this ordinance is to prevent cars from being driven away by joy riders and thieves. The locks are to be of any kind or type that will not hamper firemen or patrolmen from moving the cars in case of necessity.

LEE TIRE COMPANY REORGANIZED

Conshohocken, Pa., Dec. 15—The formation of the Lee Tire & Rubber Corp., this city, has completed the refinancing of the Lee Tire and Rubber Co., which has provided for a large increase in its output. The new company has 100,000 shares issued of an authorized amount of 150,000 shares, no par value. The output is to be increased from the present rate of 200,000 tires a year to at least 400,000.

NEW CAR NEARING COMPLETION

Freeport, Ill., Dec. 14—The experimental work upon the motor cars to be manufactured in Freeport by the Henney buggy branch of the Moline Plow Co., is about completed. The models are under construction in Detroit and will be shipped to Freeport shortly for assembling and painting. By January 1 the cars will be ready for testing upon the street. Material is being purchased and efforts will be made to place cars upon the market early next summer.

New England Anticipates Car Famine

Heavy Sales in West and Southwest May Cause Shortage in East

BOSTON, Mass., Dec. 15—There will be a shortage of motor cars for New Englanders next season. That is the opinion of men who have studied motor conditions throughout the country, and their conclusions are based upon sound reasonings.

New Englanders are canny and they do not want to let go with their money unless it shows a return. So when cold weather comes many of them, who know they want motor cars in the spring, refused to be coaxed or cajoled into giving an order, particularly if they live in the northern part of this section where there is snow and poor roads. They feel that the dealer should store the machines instead of putting them unused in barns or garages. Then they reason out that they can go to the Boston show in March, order cars and get them early enough for use.

Throughout the country there has been a wave of prosperity due to the work in munition factories. Men are getting higher wages with lots of work. They will order cars. Now take New England. In Maine, potatoes are selling today at more than \$2 a barrel. Last year at this time they were down to 40 cents, and thousands of barrels were freezing in freight cars or rotting in the ground or in barns. With a big demand and such a great increase in price, there will be a lot of money gathered in Maine this winter and the farmers will be looking for cars in the spring.

New England is a great manufacturing center, and on a square mile and population basis, it is estimated that more war contracts have been placed there than any section of the country twice the size.

Now take the plans of a number of motor dealers, who have arranged to sell cars on time. There are a surprising lot of them in addition to the ones whose factories back such schemes. These plans appeal to the workers and so next spring they will be about ripe for ordering motor cars. And when they go to order them, prospective buyers will find that the people in the west and southwest, on the Pacific coast down in the Gulf states, where they have no snow to hold up the enjoyment of motoring, have the cars.

PUSH PLANS FOR HILL CLIMB

Chicago, Dec. 14—Plans for the proposed hill climb up Pike's Peak, which Colorado motorists intend to promote next summer, are practically completed and N. L. Drew, a representative of the Pike's Peak Automobile Highway Association, passed through here yesterday on his way to New York, where he will confer this week with Richard Kennerdall, chairman of the con-

test board of the American Automobile Association, relative to the rules for the event, which will be the most arduous and spectacular hill climb ever staged.

According to the Colorado Springs' emissary, there will be two events, one for cars with a piston displacement of 231 cubic inches or under and a free-for-all. For the latter contest, Spencer Penrose, a wealthy resident of Colorado Springs and a brother of Boise Penrose, United States senator from Pennsylvania, has offered a gold cup that will be made of Cripple Creek nuggets and hung up for competition annually. In addition to this trophy, the promoters will vote a large enough purse to attract the star drivers of this country.

The new motor road to the summit of Pike's Peak, which will be used for the proposed contest, is an ideal course. It is 17 miles in length and at one point the cars can be seen for 12 miles. The cars will climb 10,000 feet in the 17 miles between Glen Cove, the starting point, and the top of the mountain, where the finishing line will be amid the eternal snows. The road is practically finished, as there is but ½ mile of grading to be done. This work will be completed early in the spring.

Before going to New York, Mr. Drew will visit Detroit and confer with several motor car manufacturers there in hopes of securing entries. He already has received promises of nominations from the Buick and White companies.

CHASE BANDITS WITH ARMORED CARS

Oklahoma City, Okla., Dec. 14—Armored motor cars are being made now for the use of officers in Oklahoma who chase bandits. The increase of bank robberies is responsible for it. Two cars are now being armored in this city and three are already in use. Steel bodies are made for ordinary cars and placed on the chassis. The tires are solid rubber, so that bullets will not puncture them. Inside the wind shield is a heavy steel plate that may be raised or lowered.

Sheriff Binion will put one of the cars into use as soon as the new body is completed. The others will be distributed around over the state for pursuit of bank and train robbers.

Many of the bank robbers have quit using horses; they are too slow in these days of motor cars. Three of the recent bank robberies were committed by men who used cars and several others had machines hidden in the country. They rode into town on horseback, robbed the bank and then rode the horses back to the cars, in which they fled, leaving their pursuers far behind.



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A Seven-Fold Tax

SHOULD the proposed tax of 1 cent per gallon on gasoline, and 50 cents per horsepower on explosion engines go through it would mean that in some states the motor car would pay seven special taxes, surely convincing proof that it is the victim of highly discriminatory class legislation.

HERE they are: One—The registration tax of the state; Two—The wheel tax that is imposed in a few states; Three—The personal property tax that is imposed in many states, notwithstanding there is the registration tax; Four—The gasoline tax of 1 cent per gallon; Five—The proposed horsepower tax of 50 cents per horsepower; Six—The proposed tax on pig iron, which is the basic material of so many parts entering into the motor car; Seven—The proposed tax on fabricated steels, which play so important a part in the motor car.

IN ADDITION to taxing the vehicle in several ways according to the state in which you live, the fuel it uses is taxed and then the majority of the steel which enters into it is taxed twice, once in the raw state of pig iron and then again in the finished state of manufactured steel.

IT IS difficult to see just why Washington so desires to tax progressive industries. The motor car industry cannot any longer be classified as a luxury industry. It is a necessity. The car goes more to the farmer than to the city, consequently the old argument of taxing the city man and not taxing the farmer fails to apply. Perhaps it is that the motor car is easy to tax and an asset upon which it is relatively easy to make collections. The cars are all registered. In nearly every state the horsepower of practically every car is known. It is thus easy for the government to fix the amount of tax in every case and very easy to make collections.

THE MOTOR car owners have been the victims of class legislation for years. It is a relatively new industry and so a good subject for taxation. It is more or less certain that the nation-wide stories of enormous profits made by a very few of the concerns have advertised the industry and perhaps given the clue to take more money out of it by taxation. Unfortunately, only a small percentage of the car makers have made money and for every concern we hear of declaring high dividends there are many that have stranded, and many more that are just holding on to the last straw. The financial advertising that the industry has received does not by any means represent the average of the companies, but only a very few of them.

THE PRESENT proposed taxation schemes will be disputed and fought by motorists over the entire country. These motorists all stand ready to carry their share of the burden due to preparedness or any other national necessity; but they are not ready to have placed on their shoulders any load of class taxes. They will not object to their due share.

MOTORISTS should stand for a wider method of collecting the tax.

They cannot stand for a tax on gasoline, and none on electricity, none on coal and none on horses, horse food, etc.

If one form of power must be taxed then all forms must be.

The man with the motor car has no more right to pay than the man with his span of well-bred horses.

Why tax the man with a gasoline launch and let the man with a steam launch go free?

Why tax the company that uses gasoline-electric trolley cars and let the other concern using electric trolley cars go untaxed?

Why tax the railroad using its gasoline motor cars and let the rival road using its steam locomotives go free?

Electrical Fittings Improve

IN THE electrical equipment of the motor car we have, today, arrived at a stage where the electric machines, generators and motors, are on a very high plane of average excellence. Trouble with a generator or a motor due directly to some fault inherent with them is very rare, in fact nearly all trouble is traceable to batteries, wiring or switches and connectors. The battery gives trouble practically only because it is so much abused and neglected by its owner, it needs its water replenishment and occasional inspection just as the engine needs to have its oil and an occasional grinding in of valves, but the engine is attended while the battery is seldom touched until nearly dead. The modern battery is a masterpiece of manufacture but it cannot be made utterly fool proof.

GENERATORS are practically self-preserving, so long as they have their bearings oiled, and wiring gives no trouble if properly installed, but there are still some details which could be better. The cry for low cost has led to the introduction of some electrical accessories which have lightness carried to the point of flimsiness. Even here the most are entirely above

reproach and manufacturers are to be congratulated upon the vastly better wiring which they are now supplying just as much as are the electrical firms to be commended for the wonderfully successful way in which they have tackled the difficult problem given them some 5 years ago when complete electrical equipment was demanded.

NO DOUBT we shall see changes for the better in almost every detail of electrical equipment in the next 3 or 4 years; the equipment is much younger than the car chassis and is hardly yet full grown, but the present state of comparative perfection is just as great a masterpiece of engineering skill as is the motor car itself, the aeroplane or the submarine. It took 16 years to develop the magneto to the stage where its presence on a car could almost be forgotten. It is not going to be as long a time from the inception to the perfection of the lighting and starting equipment. While we may look forward to steady improvement for 20 years to come, we are within sight of a commercial perfection at least as great as that of the magneto.

Bible Quotations Clinch Car Sales

Oregon Minister, Between Sundays, Acts as Agent for Ford in Portland



A MOTOR car salesman, living way out west in Portland, Ore., has the bulge on all of his rivals. He can quote scripture to fortify a point at any angle of his sales talk.

This man is the Rev. George C. Carl, pastor of the First Brethren church. On Sundays, he converts his flock to the precepts laid down by the gospel and on week days he converts whomsoever he may to worship at the shrine of the Ford radiator.

The records at the Portland branch of the Ford company show that the minister-salesman sold 120 cars during the past year and that in one month, March, 1915, he sold as many as twenty-six machines.

As he bumps up against all sorts of people in selling cars he finds ideas for his sermons and while studying the Good Book and preaching, he runs across passages that help him in making sales.

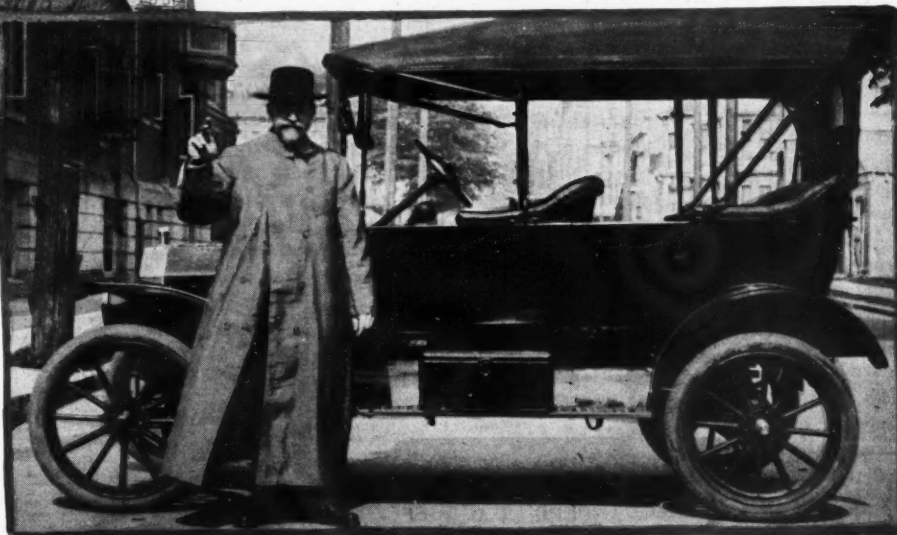
"Surely I quote from the Bible whenever I find a passage that fits," said the Rev. Mr. Carl the other day. "The lawyers quote from the Bible, why shouldn't I? That's my business, anyway."

"For instance, when I run across a man with considerable means who ought to have a machine, but who is afraid to spend any money, I remind him of what Solomon says in the Bible: 'We can't tell who will be after us, whether they will be wise men or fools.'"

"To such men I say: 'What's the use of hoarding up a lot of money for the next generation when you don't know how they are going to employ it?'"

"Solomon, in the Book of Proverbs, also says the 'righteous man regardeth the life of the beast,' and I tell some prospective purchasers that they ought to save their poor dumb horses by putting their load on a motor car. Solomon also tells us that 'a man should live joyfully all the days of his life with his wife.'"

The Rev. Mr. Carl has been a minister for 24 years and he says that calling will



Rev. George C. Carl and his Ford demonstrating car

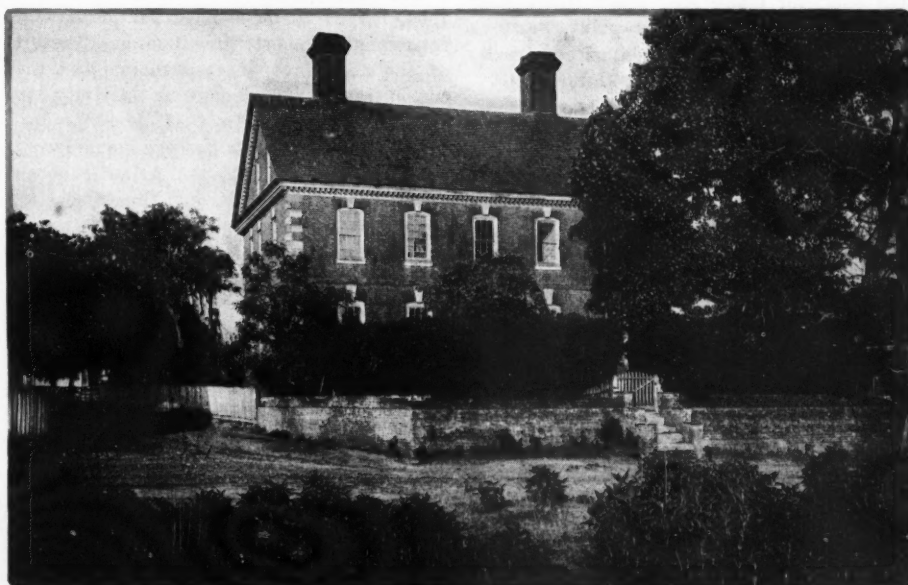
always be first in his mind. During most of his service he has received little or no salary. About a year ago his financial

status became such that he had to raise some money to pay off the debt resting against his home property in Portland. Accordingly he stepped out of the pulpit into the motor car agency.

But this does not mean that he deserted his congregation or slighted them in the least. Church work has always been foremost with him. When his services are requested at a

funeral, or he feels a call would do some aged couple or an ill person good, he is a minister first, last and all the time.

See America First — • • • See America Now



EDITOR'S NOTE—This is the fifty-seventh of a series of illustrations and thumb-nail sketches of scenic and historic wonders of America to be published in Motor Age for the purpose of calling attention of motorists to the picturesque points of interest in their own country.

IN historic Yorktown, Va., stands the old home of Thomas Nelson, son of William Nelson, governor of Virginia in 1770 and 1771. It was Thomas Nelson who introduced a resolution in the Provincial Convention, instructing the Virginia delegates in the Continental Congress to move for a declaration of independence and later Nelson was one of the signers of this historic document.

Famous Motor Junked

Barney Oldfield Sends Engine of Historic Fiat Cyclone to Scrap Heap

Buys Mercer Power Plant to Use in Dirt Track Car

LOS ANGELES, Cal., Dec. 14—One of the most famous and feared motors known to followers of the speed game has been sentenced to the junk pile. Barney Oldfield's Fiat 90-horsepower motor is to come out of the famous Fiat Cyclone and go on the scrap pile. Its successor is the Mercer 450 cubic inch engine which pulled the Mercer No. 4 into first place on the Corona course a year ago last Thanksgiving day when Eddie Pullen shattered all road and speedway records.

Oldfield closed a deal with George R. Bentel yesterday whereby the veteran speed creation will be known in the future as the Mercer Cyclone. With the Mercer motor, the car will be 200 pounds lighter. This motor weighs 600 while the old Fiat "90" motor weighs 800 pounds. With the new equipment the Cyclone will not weigh more than 1,800 pounds.

After more than 8 years of service in the speed game, the Fiat motor has outlived its usefulness. A broken connecting rod, which occurred in the recent Phoenix, Ariz., track race, put the Fiat 90 engine out for the count.

According to experts, the old engine is "shot." The parts are crystallized and all the work in the world would never make it reliable again. The chassis is still good for many long speed duels and with the Mercer 450 power plant, Barney will have one of the most dangerous track speedsters in the world, it is claimed.

The reason for the excellent condition of the chassis is this. It is a laminated job. That is, there are two frames in one. In 1908 Amilo Cedrino was killed in the Cyclone when a wood wheel collapsed. At that time it carried a Fiat 60-horsepower motor.

The car was the property of the New York Import Co. and in 1909 was loaned to Ralph de Palma who became the Cyclone's pilot.

In 1912, the day after the Santa Monica road race, Bragg drove the car on the Los Angeles motordrome 5 miles in 3 minutes 11 seconds setting a mark.

Eugene Hewlett of this city then purchased the car and Tetty Tetzlaff took the helm. One of the most sensational races in

which it appeared was on the motordrome in 1913 when Tetzlaff beat Barney Oldfield on the Christie two out of three heats.

In the spring of 1914 Oldfield purchased the car and created a new record in the inaugural meet on the Bakersfield track, winning the 50-mile free-for-all. Since then Barney has campaigned all over the country with the Cyclone. It has been considered the fastest middle-distance track in the world.

With the Mercer motor, it is claimed the car will be even faster. The Fiat motor was a slow speed motor, while the Mercer power plant is a high speed engine. Developing power at higher speed, the Cyclone will necessarily be geared lower. It will now be one of the greatest long distance track cars. Once it was limited to 50-mile events; now it is good for three times that distance.

A new rear axle was recently put in and the Houk wire wheels are practically new. With the new motor Barney says he will have some car for the opening event on the local Ascot Park speedway, December 26.

VANDERBILT CUP SPEEDWAY PRIZE

New York, Dec. 15—The Vanderbilt cup, America's oldest and most historic motor racing trophy, is scheduled for a shift in fortune and probably will be hung up for speedway competition at the opening race of the 1916 season, the May 13 contest at Sheepshead Bay.

According to a report now current, the directors of the New York track have induced William K. Vanderbilt, Jr., donor of the cup, to change his deed of gift in order that the trophy, a road racing prize, may be used for speedway competition.

The cup, which was first raced for in 1904, looked to be doomed for permanent retirement a short time ago as a result of the decadence of road racing and the concentration of promoting activity in speedway events. In fact, Mr. Vanderbilt announced that he was considering dropping the cup into the Atlantic ocean on his next trip to Europe, thus disposing of it for all time.

The acquisition of the Vanderbilt cup gives the Sheepshead Bay track three trophies, for it already has the Astor and Harkness cups.

Shorten Chicago Race

Distance of Windy City Contest Cut From 500 to 300 Miles for 1916

Promoters Ask for May 20 Date for Amateur Event

CHICAGO, Dec. 15—There will be no 500-mile race on the Chicago speedway during the season of 1916, the directors of the local track following the example of the Indianapolis promoters and reducing the distance of their feature event to 300 miles.

The local impresarios also have adopted a policy of financial conservatism and conservation of gate receipts and have cut the prize money from \$54,000, the amount given the drivers in 1915, to \$30,000. Although the division of the purse has not been decided upon definitely as yet, it is probable that the winner will receive \$12,000, or 40 per cent of the total.

Chicago's 300-mile race will be held June 19 and the entry blanks will be sent out immediately. The entry fee will be \$100, but this is but a forfeit to guarantee appearance as the money will be refunded to the entrant provided his car reports for the elimination trials.

The directors of the Chicago speedway have decided on May 20 as the date of the amateur drivers' race and entry blanks will be mailed as soon as the contest board of the American Automobile Association confirms the special set of rules for this event, which were drafted by a special committee of the Chicago Automobile club.

David R. Reid, president of the Chicago speedway, recently returned from New Orleans where he is interested in the promotion of a 2-mile track. Although it was the original intention to have the oval in the crescent city completed for an inaugural meet during Mardi Gras week in February, this now seems impossible.

DE PALMA WITH PACKARD COMPANY

Detroit, Mich., Dec. 15—Ralph de Palma, winner of the 1915 Indianapolis 500-mile race, has joined the experimental engineering staff of the Packard Motor Car Co. and during the winter will assist Jesse G. Vincent, vice-president of engineering, in

developing new models. The famous Italian will spend his spare time supervising the reconstruction of his Mercedes, which will be rebuilt in the Packard shops in hopes of getting it back in shape for the 1916 speedway campaign.



Vivian Pritchett, of Millville, N. J., winner of Winton six chauffeurs' contest

New Premier Company

Syndicate of Indianapolis, Joliet
and Detroit Bankers
Interested

Laycock Plant Is Secured and Ma-
chinery Will Be Installed

INDIANAPOLIS, Ind., Dec. 14—Following the purchase of the Premier Motor Mfg. Co.'s plant by a syndicate as announced in Motor Age for Dec. 2, a new corporation is being formed which will be known as the Premier Motor Car Co. It will have a capitalization of \$2,500,000 and will continue the manufacture of Premier cars. A deal has been completed by which the new company becomes the owner of the T. B. Laycock Co. plant, and all the machinery and other material at the old Premier plant will be moved to the Laycock factory. A manufacturing concern which has been occupying a part of the plant will move out to make way for the new Premier company.

The new Premier Motor Car Co. is composed of a syndicate of manufacturers and bankers from Joliet, Ill., Indianapolis and Detroit. The prime movers in the enterprise are J. C. Flowers, of the Gerlach-Barklow Co., Joliet; E. W. Steinhart, Indianapolis; C. F. Jensen, president of the Vanguard Mfg. Co., Detroit; F. W. Woodruff, vice-president of the First National Bank and the Woodruff Trust Co., Joliet; George Woodruff, president of the First National Bank of Joliet and president of the Illinois Bankers' Association; T. R. Gerlach, vice-president of the Gerlach-Barklow Co., Joliet, and H. L. Thompson, secretary of the Gerlach-Barklow Co., Joliet.

The Laycock plant consists of a main building 900 by 300 feet, with a 137 by 70-foot three-story administration building and a modern power plant, all being located on a 43-acre tract inside the city limits overlooking Brookside park.

The buildings just acquired are of brick, steel and concrete construction and an automatic fire-sprinkling system is a feature. It is stated that 3,500 men will be employed in the plant and that several large new buildings will be erected. The appraised value of the Laycock real estate plant and equipment is approximately \$1,000,000, and it is said that there will be no mortgages or debts of any kind against the company or its plant.

WINTON CHAUFFEUR CONTEST ENDS

Cleveland, O., Dec. 13—More than 300,000 miles of travel without a single cent expended for repair expense is the record made by twenty-five winning drivers in the 1915 contest for Winton six chauffeurs.

This is the first time in the eight annual contests for Winton prizes that every

money winner came through with a clean score, as will be seen in the summary covering the entire history of this event:

Year	Number of Cars	Total Mileage	Total Repair Expense
1915	25	303,919.3	None
1914	20	359,166.2	\$ 49.97
1913	20	294,774.8	31.46
1912	20	290,759.0	131.98
1911	20	394,333.9	20.88
1910	10	165,901.9	6.96
1909	10	118,503.0	127.30
1908	10	65,687.4	15.13

Totals135 1,992,995.5 \$383.68

Average repair expense for the entire distance of nearly two million miles is 19¼ cents per thousand miles—undoubtedly the world's record.

The Winton six contest was inaugurated when the Winton Co. first produced sixes exclusively and has been renewed annually. It is open to all employed drivers of Winton six cars. Drivers are required to submit monthly reports of daily mileage and repair expenses, the car owner attesting each report. The prize winners follow:

Prize	Winner	City	Total Mileage
\$500	Vivian Pritchett	Millville, N. J.	12,500
400	F. S. Weaver	Easton, Pa.	12,500
300	A. C. Burton	San Francisco	12,500
200	W. M. Newsome	Atlanta, Ga.	12,500
100	Hugo Larson	High'd Pk. Ill.	12,500
100	E. A. Withers	Montreal	12,500
100	Herbert Lewis	Orange, N. J.	12,500
100	J. L. Dendero	Br'kline, Mass.	12,500
100	Robt. Clements	Andover, Mass.	12,500
100	Jas. F. Kerrigan	Newton Center, Mass.	12,500
100	Wm. F. Swart	Yonkers, N. Y.	12,500
100	Thomas Murren	Boston, Mass.	12,500
100	Geo. T. Maccone	Stockbridge, Mass.	12,500
100	Grant E. Gregor	Philadelphia	12,500
100	E. Ziegeler	N. Y. City	12,500
100	Geo. M. Lewis	Syracuse, N. Y.	12,500
100	Robt. Goetsch	Tarry'tn, N. Y.	12,500
100	P. O. Hale	Walth'm, Mass.	12,500
100	E. M. Armstrong	Boston	12,500
100	Clarence Hudson	Philadelphia	12,500
*100	W. J. Desillire	Boston	11,267
*100	Paul Hesselberg	Bronx, N. Y.	12,464.7
*100	Wm. C. Ball	Kalamazoo Mich.	11,380
*100	Geo. H. Von Arx	St. Louis	12,416.4
*100	B. Thyssen	Los Angeles	6,391.2

* Winners of district prizes.

FISK GETS FEDERAL TIRE

Milwaukee, Wis., Dec. 13—Rumors of long standing that the Fisk rubber interests of Chicopee Falls, Mass., were negotiating for control of the Federal Rubber Mfg. Co., Milwaukee, Wis., were confirmed Saturday night, when official announcement was made that Byron C. Dowse, president and general manager of the Federal, had disposed of his interests and is succeeded as executive by H. T. Dunn, Toledo, O.

It is stated that the Federal company will continue as a separate and distinct organization under its present name, and the change is simply one of ownership.

The board of directors will be increased at once from five to nine members, who are: H. T. Dunn and J. E. Kepperley, Toledo; H. G. Fisk, E. H. Broadwell, G. A. Ludington and E. M. Bogardus, Springfield, Mass.; and B. H. Pratt, Herbert A. Githens and Richard Ward, Milwaukee. Officers have been elected as follows: President, H. T. Dunn; vice-president and general manager, B. H. Pratt; assistant general manager, H. A. Githens; treasurer, H. G. Fisk; secretary and assistant treasurer, Richard C. Ward.

Will Build Owen Cars

New York Concern Consolidates
With Baker R. & L. Co.
of Cleveland

Capital Stock Will Be Increased to
\$5,000,000

NEW YORK, Dec. 13—A consolidation of the Owen Magnetic Co., of this city, manufacturer of the Owen magnetic car, and the Baker R. & L. Co., Cleveland, O., has been effected. The new concern will be known as the Baker R. & L. Co., but the cars to be manufactured will be known as the Owen Magnetic, which will be built in two models. The Baker factory in Cleveland will be given over for the manufacture of Owen magnetic cars. The R. & L. factory at Cleveland will be used for the manufacture of bodies for the Owen magnetic and in addition will continue the manufacture of electric cars, which the Baker R. & L. Co. has been producing.

The present capital of the Baker R. & L. Co., will be increased from \$2,000,000 to \$5,000,000. R. M. Owen, who is president of the Owen Magnetic Co., in this city, will be vice-president and director of sales. The General Electric Co., which recently obtained a considerable interest in the Owen Magnetic or Entz patents, will have a director on the board of the R. & L. company because of its interests in the electric transmission used in the Owen magnetic cars.

The present Owen Magnetic factory, in this city, will be continued for development purposes as well as serving as a service department. The assets of the Owen Magnetic Co., however, have all been acquired by the Baker R. & L. organization.

It has been known for some months that the Baker R. & L. Co., was producing a gasoline-electric car built under the Entz patents, which are the basic ones in the Owen magnetic design. This car is a smaller one than the present Owen magnetic which has been on the market during the past year.

The smaller Owen magnetic will use a six-cylinder motor 3½ by 5 inch bore and stroke with 126-inch wheelbase. It is claimed to turn in a circle with a diameter of 38 feet. This new car is specially designed to meet the needs of town-car work and is well suited for inside drive types, such as sedans, etc. This chassis was developed with a view of meeting the requirements of those owners at present using electric cars.

The Fort Wayne factory of the General Electric is already tooled up to take care of the manufacture of electric units for these two models of Owen magnetic cars, as well as to manufacture units for other concerns that may be licensed under the Entz patents to manufacture magnetic cars.



Banquet of Detroit section of Society of Automobile Engineers held at Hotel Pontchartrain

Detroit Section of S. A. E. Comes to End of "Perfect Year"

Many Notables of Motor Car Industry Attend Annual Banquet to Celebrate Achievements of 1915

DETROIT, Mich., Dec. 9—As a fitting climax to its activities of the year, which have been the most successful in its history, the Detroit section of the Society of Automobile Engineers held a monster banquet to 450 manufacturers, engineers and other representatives of the motor car industry here tonight. It was a big affair not only in point of numbers, the guests swelling to overflowing the banquet hall of the Pontchartrain Hotel, but also in the striking enthusiasm and co-operative spirit which pervaded the entire assembly.

Many Notables Present

Many well-known motor car men were in attendance, including officers of the national S. A. E. President W. H. Vandervoort acted as toastmaster and at the speakers' table there were among others C. W. Nash, president General Motors Co.; H. M. Jewett, head of the Paige-Detroit Motor Car Co.; Howard Marmon, Nordyke & Marmon; Colonel Charles Clifton, head of the N. A. C. C.; Coker Clarkson, general manager S. A. E.; John F. Dodge, Dodge Bros.; W. C. Anderson, Anderson Electric Car Co.; Arthur B. Cumner, S. A. E. council; David Fergusson, Pierce-Arrow Motor Car Co.; W. E. Flanders, president Maxwell Motor Co., Inc., Christain Girl, Perfection Spring Co.; Earl Holley, Holley Bros. Co.; E. W. Lewis, Timken-Detroit Axle Co.; Wm. E. Metzger; C. S. Mott, Weston-Mott Co.; Thomas Neal, General Motors Co.; C. A. Pfeffer, Chalmers Motor Co.; C. B. Rose, S. A. E. council; J. G. Rumney, Detroit Steel Products Co.; W. R. Strickland, Peerless Motor Car Co.; R. H. Spear, Scripps-Booth Co.; John Utz, Perfection Spring Co.; S. D. Waldon, Cadillac Motor Car Co.; W. E. Scripps,

Scripps-Booth Co.; Artemus Ward, Jr., King Motor Car Co.; Percy Owen, Saxon Motor Corp.; George W. Houk, Houk Mfg. Co.; J. W. DeCou, Jeffery Co.; H. W. Alden, Timken-Detroit Axle Co.; Fred Haines, Regal Motor Car Co.; Harry Bassett, Weston-Mott Co.; George W. Dunham, consulting engineer; F. E. Moskowics, Nordyke & Marmon; Lee Anderson, Hupp Motor Car Co.; and W. C. Rands, Rands Mfg. Co.

This is without doubt the most representative gathering of motor car men ever held in Detroit and their presence gives fitting proof of the rapid strides that the society is making not only nationally but locally as well.

The speakers of the evening were, in addition to the toastmaster, Col. Charles Clifton, whose topic was "Engineering Co-operation;" Nicolas Kouznetzoff, representative of the Russian government, who greeted the gathering in his native tongue; James Schermerhorn, publisher of the Detroit Times; Isaac F. Marcossion whose subject was "War and Business," and Arthur Nealey, the boy president of the Illinois Model Aeroplane Club of Chicago, who made some predictions regarding the future aeroplane.

President Vandervoort, before introducing the first speaker, took the occasion to plead for greater co-operation between the manufacturers and the engineers who design their cars. He said he could think of no better Christmas present for worthy employes than to give them a membership in the society.

Col. Charles Clifton briefly summarized the early performances and contests of motor cars as an introductory to his main

topic. One generation ago the experimental car made its bow in America, he said, and 20 years ago Thanksgiving day there was a so-called race in Chicago. To qualify, the machines had to cover a 33-mile course in 9 hours. None of them did it in 9 hours but the prize was awarded anyway because it was bad snowy weather. He contrasted that early performance with the ability of the car of today. The thousands of motor vehicles in use today are an example of the greatest co-operation the world has ever known. They are the result of co-operation of human instincts and Col. Clifton holds that this spirit of getting together for united effort must continue to grow as the industry grows.

Interpreter Speaks

B. V. Constantinoff, interpreter for Nicolas Kouznetzoff, Russia's representative, spoke for his principal and greeted the American engineers on behalf of his people. America now, he said, is a heart of motordom and Russia wants us to bring some business to that country. "We need you there and you think so little of us," he said.

Mr. Schermerhorn, after a series of rapid fire moral lessons and an entertaining mixture of humor, paid tribute to Henry Ford when he said: "In your hearts you should be thankful that your industry has produced the man to head the peace expedition which has set forth with an honest desire to bring about peace. Fanciful, unpractical, fanatical and all, it may be, but despite the criticism, it is sincere."

Mr. Marcossion, in his authoritative talk on "War and Business," told the manufacturers that they must prepare for a gigantic trade war with Europe.

Light Dimmers Tested

Examination of Non-Glare Devices Made by Committee of Bay State Club

Special Appartus Is Used and Trials Will Be Continued Indefinitely

BOSTON, Mass., Dec. 14—The Massachusetts Automobile Club recently conducted an educational test on anti-glare devices before 500 motorists for the purpose of observing whether the different non-glare devices really eliminate the glare or not. The tests were conducted with the sanction of the Massachusetts highway commission, which has the power of regulating these devices, but Col. Sohler, chairman of the commission has refused to make any official statement as to whether or not any particular devices meet the requirements of the law that goes into effect January 1.

The tests were conducted in a closed room 140 feet long and of width sufficient to test the devices. The floor was painted black to represent an oiled roadway and a stand was erected at one end on which the headlights were mounted at the ordinary height above the ground. At each side of the stand at an angle of 45 deg. or 10 feet on the side and 10 feet in front were two wax figures to represent pedestrians. Just 50 feet in front of the light stands was a crossbar, 3½ feet high. At the extreme end of the imitation roadway stood another figure supposed to be a pedestrian. These conditions were intended to represent as nearly as possible the law requirements, in that they will not glare or dazzle 3½ feet above the ground or 50 feet ahead, but will clearly show up objects 150 feet ahead and standing at either side of the road.

No official results were given but the sentiment seemed general among all the spectators that the present-day lights with a small bulb, that is, the dimmer arrangement, will not satisfactorily meet the requirements of the Massachusetts law.

The club intends to retain its testing place for some months so that manufacturers of other devices will have an opportunity of making tests whenever desired.

In the tests some of the non-glare devices would pick up the side objects, but were strong enough to make the objects at 150 feet clear. In other cases the devices gave sufficient light at 150 feet, but were glaring 3½ feet above the ground at the 50-foot line. In several cases where the lense was frosted all over, the glare was eliminated but there was not sufficient light to show objects at 150 feet distant.

Some of the devices tested were: Aderente Non-Blinding Co., Jersey City, N. J.; Opalite Deflector, New York; Legalite lense, Boston, Mass.; J. M. Non-Blinding

lense, New York City; Haskins lense, New York; Reliable Sales Co. lense, Perrin No Glare, Osgood Auto Light Deflector, Greenwood Silvered bulb; Lancaster lense frosted, Jones lense, Gray & Davis Frosted bulb, Gray & Davis frosted top and bottom with a clear surface slit horizontally, Lancaster lense all frosted, Lancaster half frosted from top, Haskins lense, all frosted, Haskins open-eye lense, Solar Eclipse lamp.

ST. LOUIS INVESTIGATES ACCIDENTS

St. Louis, Mo., Dec. 15—A grand jury investigation of the extraordinary number of motor car accidents which have occurred in St. Louis—especially since the enactment of the anti-glare headlight ordinance—was begun here last week. Chief of Police Young was the first witness before the jury, but there is no intimation of what he told the inquisitorial body.

In his instructions to the jury, Circuit Judge Grimm called attention to the fact that more than fifty persons have been killed and more than 200 injured by motor cars in St. Louis during the last 11 months. He said he did not know how many of these accidents were due to carelessness upon the part of drivers, but thought the frequency of the accidents warranted investigation.

He pointed out that when a person was killed through the negligence of another, the one responsible could be charged with manslaughter in the fourth degree and could be punished by imprisonment in the penitentiary or jail or by fine. The circuit judge said that petit juries in many cases had been too lenient with motorists and he urged the grand jury to indict all motorists whose violation of the statutes has been brought to its attention.

Movie Mascot New Fad

Film Stars and Fans of Los Angeles Have Miniature Camera on Radiator Cap

Cinematograph Is Small Enough to Take Tom Thumb Drama

LOS ANGELES, Cal., Dec. 15—Have you L seen the latest movie craze?—the "Movie Mascot." Every movie star in town, and in fact everyone connected with the great film industry, is grabbing them as fast as they can be made.

It is nothing but a miniature motion picture camera which stands 5 inches high. The big cameras are 6 feet. The little souvenir camera is to be seen on the radiator caps of picture folks' cars, on everything from a reincarnated Ford to the mighty lords of the highways and the luxurious limousines of Broadway.

The little camera with its tiny crank no larger than a pin, and a lens that would take the picture of a Tom Thumb, was conceived by Clarke Irvine, local staff correspondent of the Moving Picture World.

The originality of the tiny camera is striking, and its construction principles are amazing. The camera proper, the box part, is made from a small block of Mexican mahogany sandpapered, stained and highly varnished. The youthful inventor of the little emblem of the film business is a resident of Santa Monica. He makes pictures in a dark room that he built himself from scraps of lumber. A part of the dark room is laid out as a small workshop.



Myrtle Gonzales, Universal film star, with movie mascot on radiator cap of her Hupmobile

Car Makers in Safety Move

IN THE big campaign for a lessening of accidents due to traffic, the motor car manufacturers and dealers have started to help in preaching the Safety First gospel not only among their own employees but among their customers and prospects. As one dealer said a few days ago, it should be the policy of every dealer in the country to have a uniform safety first card or small folder giving briefly such information of a general character that will appeal to every man who reads it.

One of the Detroit manufacturers who has taken up this campaign is the Consolidated Car Co., manufacturer of the new Abbott-Detroit. Vice-president Morgan J. Hammers has had printed a large sized card, in black and red, with admonitions and instructions for the benefit of car owners, and one of these cards is being attached to every car brought in an Abbott-Detroit service station.

The front side of the card reads as follows:

ABBOTT-DETROIT SPECIAL SAFETY NOTICE

"Here is your car turned back to you in good condition, service having been rendered on it, as per your request and instructions.

"And now we have a simple request to make. If you comply with it the benefit will be yours in full measure. Here it is:

"Join the increasing number of automobile owners who resolve that from this day on they will exercise more care in the handling of their cars than they ever have before. Do your part in the gigantic crusade that is on now all over the United States against reckless and careless driving, and in support of traffic conditions that will eliminate as far as possible the loss of human lives, due to automobile accidents of any kind.

"Do not let your car become a death car. We know that you shudder at the thought of it, but a little thought of such a possibility now, and from time to time as you go along, may prompt you to take the precaution that will be the means of

saving you from the bitterness of such an experience later on.

"Your car is a good one, it has plenty of power to give it a nice, smooth motion at low rates of speed in heavy traffic, making it easy for you to drive properly under these conditions. It is equipped with powerful brakes, and every other necessary means of giving you absolute control.

"You have confidence in your car and we have confidence in you. We believe that you will decide, and will be able, to help tremendously toward the success of this campaign, a success that will go a long way toward keeping the motor car where it can continue to be the greatest material agent in the promotion and advancement of health, comfort and happiness in the American family.

"CONSOLIDATED CAR CO.,
"Detroit, Mich."

The reverse side gives further warning and advice. It reads:

DANGER

"Do not throw this card away. Show it to the other members of your family; show it to your neighbor; ask him to show it to the Service Station manager where he gets service on his car, no matter what make of car it is. This may lead to a similar action on his part, co-operative toward a system of better traffic conditions.

"Some may suggest that the pedestrians are at fault; it may be that they are to some extent; in that case the campaign of education on traffic conditions will be taken up with them, but for the present, let us concern ourselves chiefly with the drivers of automobiles.

"Write to the office of police commissioner, and ask for a copy of traffic regulations and study them. The police commissioner is making a strong fight toward the solution of this problem, and it is a gigantic problem to solve, a new problem, born of rapidly-increasing new conditions. The commissioner of police is battling to solve this problem for you, and for everybody. Your effort and support will aid materially.

"Resolve now that you will help.

Akron's Street

THE Akron Automobile Club is probably the first and only club in the United States to go so far in its work of aiding traffic control as to place on the streets traffic semaphores bearing the club's name at busy intersections of Ohio's great tire mecca.

The standard selected by the Akron club follows the now popular stop-and-go type. A feature which has been added is the detachable light which the club has fastened on top of the semaphore at the request of Safety Director Daniel Stein. The light shows red when the word "stop" appears and green when the standard is turned to permit traffic to proceed.

The traffic semaphores used in Akron are not patented and can be made in small quantities at about \$5 each.

Another achievement of the club which might be copied by motorists' organizations with profit is the lighted warning signs placed by the club along the beautifully curving Gorge route leading into the rubber center. While



Traffic Signal

the road is among the most scenic brick-paved highways in America its grades and curves nevertheless hold an element of danger for the reckless or careless driver.

In order that vehicles shall be warned at night—when the need for warning is the greatest—the club has placed along the roadway four handsomely painted boards, 4 by 5 feet, on 4 by 4 oak posts. Each of these signs is illuminated with three 40-candlepower electric globes. They stand 7 feet in the air and cost about \$25 apiece to erect.

These lights, according to Secretary Grover Reese, loom up in the darkness at night to jog the memory of the way-faring motorist like lighthouses on a rock-bound coast warn the storm-beaten mariner of perils around him. No one will ever be able to estimate the number of accidents they prevent, he says, but all who pass admire them and as a result a movement has been started to erect similar signs at several other points.

Mark Roads by Colors

Connecticut Highways to Be Designated by Blue, Red and Yellow Bands on Poles

Danger Signals Also Will Be Placed at All Railroad Crossings

HARTFORD, Conn., Dec. 13—Highway Commissioner Charles J. Bennett made final arrangements today to begin work on the establishment of a color route code for the designation of the main-traveled highways of the state. The colors will be blue, red and yellow. The work will be done under the general supervision of George E. Hamlin of the highway department, who has had charge of the preparatory work. The supervisors of road construction will be the local superintendents, the supervision of each being confined to his territory in road construction.

The signs will be painted on telegraph poles and other places and danger signals will be fastened to posts, about 2,000 in all. These signals will be placed at railroad crossings and at cross roads where there is danger of accident. The officials of the department will not establish signs in cities as the department's jurisdiction is limited to towns, but they will communicate with the officials of municipalities with the view of securing co-operation in the work of establishing continuous routes through the state.

The system adopted is known as the tri-color, red designating east and west routes, blue north and south, and yellow diagonal or secondary routes. These colors and their arrangement will conform to the system of other New England states. Care will be taken that the proposed lines in this state will connect the main lines in the adjoining states so that the tourist will have well-defined, inter-state highways.

In marking the routes it is proposed to use bands of color about 8 inches in width on telegraph and other poles and the end posts of railings. On continuous lengths of road without intersections bands will be placed at distances between poles that will be sufficient to indicate the route. At all intersecting roads four poles will be banded on either side of the intersection to clearly direct the travel along the route.

The system of color bands will be reinforced with markers in the shape of arrows and mounted on posts at main intersections. These markers will be 7 inches in width enclosing an arrow 5 inches in width and of the same color as that which designates the route. The name of the next large town will be painted on the sign in 4-inch letters. Where two different routes intersect, the pole at the junction will be marked by a band of each color. At this corner will be erected two or more arrow signs directing the tourist.



Two Smart Winter Coats for Women Motor Enthusiasts

The coat at the left is made of leather of American beauty shade. It fastens with black leather buttons, has a black velvet collar and is trimmed at the waist line with tabs of black patent leather. The coat at the right is a taupe suede model, lined with a hunter's green satin. The turban is made of beaver and has a green leather ornament at the front. The illustrations were made from photographs copyrighted by the International Film Service, Inc.



Fleet of Pierce-Arrow trucks taking war munitions through snow to French troops

Driving Military Cars an Arduous Job

Men Serving in Motor Corps of Allied Army Face Hardships and Many Risks

PARIS, Nov. 20—General Gallieni, the new war minister, is on a campaign against all favoritism and abuse of privileges. His activity has been drawn towards the motor car section of the army and very drastic measures have been taken in one particular case. An officer in the territorial army had taken as his orderly a soldier who was the private owner of a car, which the officer and soldier made use of for their military duties. While there is nothing in the regulations specifically against this, the minister of war considers it an abuse of the spirit of the law, for the fact that he owned a car gave the private soldier an advantage over his companions and the officer got the use of a non-military machine.

Drivers Classed as Shirkers

As a punishment, the officer has been condemned to 60 days' imprisonment in a fortress and to the loss of his rank. If he is of military age he will still be eligible to serve as a private. The owner of the car has been ordered to take his place in the reserve depot and to be sent to the front with the first draft. This decision has been sent to all military commanders as an example.

In motor car circles, there is some annoyance at the tendency of military authorities to look upon professional drivers and mechanics as shirkers. The purely military view is that any old man can be taught to handle a truck or a touring car and that the best place for young professional drivers is in the trenches. Thus men totally devoid of mechanical ability are being rough hewn into drivers and

men of 20 years road and factory experience are sitting behind a gun. One specific instance is that of Louis Wagner, the Vanderbilt cup winner, who until recently was serving as a private, while the truck driver attached to his regiment was a former village schoolmaster with 1 week's experience at the wheel.

Speed Kings Turn Aviators

There also is a tendency for the professional military view, regarding motorists, to be shared by the general public, with the result that car drivers are considered to be in less danger than men serving in other branches of the army. Because of this a large number of professional race drivers have asked for and obtained transfers to the flying corps. The men consider that they are in no more danger in the air than on the road, but they get credit for undertaking more difficult work.

As a protest against the present system, a syndicate of motor car drivers and an association of motor car manufacturers at Lyons has written to the minister of war and other public officials asking that all professional drivers and mechanics should be drafted at once into the army motor service. The next set to be called up for motor service should be those men who had once been professional drivers; following this, drafts should be taken from private motorists holding the government driving license, the men with the oldest licenses being called first.

"The man who is driving an ammunition truck at the front has got the least satisfactory job in the whole army," declares a motor car agent who has been

serving as a private in the infantry since the beginning of the war, and was present at the great Champagne battle last September.

"There is an impression, that driving is the soft job of the war, but as a practical motorist I would much rather be serving in the trenches than at the wheel of a truck. The number of shells which had to be fired by each gun prior to the infantry attack in Champagne was really prodigious. Thousands of American trucks were running day and night taking shells right up to the gun positions, for the old methods of transferring to horse team has long been abandoned. Generally the guns are in positions away from the main roads, but special tracks are made so that trucks can go right up to them. The ammunition is unloaded and placed in underground shelters within easy reach of the battery. Naturally the enemy keeps a close watch for the ammunition columns and shells them whenever possible. If an enemy's shell strikes an ammunition truck, there is not much left of either truck or man. In the big attack, a certain number of American trucks were blown up in this way.

Truck Drivers Hard Worked

"When a big offensive movement is in progress, truck drivers are much harder worked than men in any other branch of the army. I met some drivers who for 3 weeks had not averaged more than 4 hours sleep out of each 24. The call for ammunition was so great that they had to work practically day and night. When off duty, they slept in hammocks fitted up inside their trucks. Some of the men have displayed considerable ingenuity in making their trucks into comfortable living quarters. They strengthen the top, so as to make it absolutely waterproof and capable of supporting two hammocks, and they make the front and end panels of the body close fitting, so as to keep out all drafts. Hay in the hammocks is an additional comfort. The beds have to be arranged so that they can be put out of the way almost instantly and brought out as quickly. In rush times the men get their sleep in snatches, and it is a great convenience to be able to pull down the hammock, get into it and sleep by the roadside for an hour.

"The men take the same care to keep their motors warm as to preserve themselves from the cold. Precautions have to be taken as a matter of safety as well as general convenience, for delay in getting away may be fatal. The most commonly adopted plan is to make two straw mats, such as are used by gardeners, one fitting closely round the motor hood and the other completely covering the radiator. An additional precaution is to drain the carburetor float chamber and leave a small kerosene lamp burning under the hood. In this way a truck can stay on the road all night and be easy to start in the morning. Water is not usually drained off,

for there may be difficulty in getting a fresh supply, and anti-freezing solutions are not much in favor.

"Not only have truck drivers little opportunities for sleep, but they cannot count on meals with the same regularity as the infantry. During the Champagne attack, drivers would often come into our quarters and beg food which they would take away with them to eat on the road. The men who are wise to the game make a point of always carrying reserve rations and a portable cooking stove. As there are two men on each truck at the front, one of them can look after the cooking arrangements while on the road or whenever a stop is made, and thus overcome the defects which are inevitable when men are moving about frequently and rapidly.

"In the great attack, trucks were used considerably for hauling captured enemy material to the rear. German guns were limbered up behind French and American trucks, the bodies filled with captured equipment and small arms and the whole hurried away to the railroad depot in the rear."

BRITISH TRUCKS DRIVEN BY WOMEN

New York, Dec. 15—The great majority of motor trucks now engaged in other than government haulage throughout Great Britain are driven by women, according to one of the prominent British motor truck dealers who recently arrived in this country. Most of the experienced men drivers have joined the colors and are driving trucks either on the continent or in the munitions service in England. For this reason the British merchants desire light vehicles of from 1 to 2 tons capacity which are easy to steer and manipulate. Some form of motor starter is also demanded, to make it unnecessary for the women to crank the engine. The female of the species is proving just as efficient as the male.

English Makers Busy in War Time

New Models Are Being Developed and Tests Made with Multiple Motors

LONDON, Nov. 25—The great advance made by American motor car engineers during the course of the last 2 years has been quite obvious. There were many who prophesied at the outbreak of war that until its close, ordinary commercial progress would be largely stagnated. Motor car progress made in this country has given the lie direct to such assertions. Even in Europe it has been commented on several times in English, French and German journals. The country most concerned, however, is certainly Great Britain.

Fear American Invasion.

Whilst the actual causes of recent tariff on imported motor cars in the country are undoubtedly cumulative, it is nevertheless an open secret that the advance made by American manufacturers in design, materials and workmanship was a potent factor in the deliberation of British manufacturers when they decided to approach the government for legislative protection. Had not American cars improved in the way they have, the British manufacturing trade would not have been so perturbed. It is admitted that so far as several specifications go, the American product is very far in advance of the British car (speaking in terms of average) as it was known at the outbreak of war.

One is led, therefore, to wonder what motor car manufacturing in England is doing. Is she sitting down calmly under fate, with hands tied by the force of circumstances, merely watching American progress in design? Is she able, whilst chiefly concerned with the production of munitions in her motor car factories, to

give attention to the all-important question of motor car progress? A knowledge of the facts will come as a surprise to many people.

Quite a number of British manufacturers are deep in the study of engine design so far as the question of the number of cylinders is concerned. When the eight movement started in America, it was not taken very seriously by the leading British manufacturers. Now, however, things are quite different. Not only is the eight being worked upon by several leading manufacturers, but in one case of importance at least, the twin six is engaging the serious consideration of the designing and experimental staff. Two experiments, they are no more as yet, go even in advance of American ideas, as in one case a water-cooled rotary engine is now being tried out experimentally by its inventor for a large manufacturer, and in another a new form of gas turbine is being finished off on paper.

Testing Twelves and Eights

In regard to the question of the eight, and the twin six, however, matters are on a more substantial basis. A number of firms are working along these lines, and the results so far obtained are very good. Incidentally there is a very ingenious new electrically controlled gearbox, which is finding much favor. It has already been proved possible so far as possibility is concerned, and it now only remains to prove whether or not the invention is practicable as a manufacturing proposition and whether it will prove sufficiently reliable not to require the usual lever control as an emergency standby.

Then again, there is a sleeve valve eight under way—and it is not made by the Daimler company. Just before the outbreak of the war, Minerva in Belgium also was busy with the design of a sleeve-valve eight.

British manufacturers are studying the refinement of these new engines very carefully. Such things as the permanency of tappet adjustment, the elimination of vibration and the reduction of skin friction for the passage of the inlet and exhaust gases are studied just as carefully as detail units of design, as the whole proposition is as an engine. In a word, the British manufacturer who puts an eight on the market after the war is expecting to take a place right in the front with the new development. If close application and careful experimenting are not behind their usual value, the eights to be marketed in the future by several leading British firms will undoubtedly be of a very high grade. Having now accepted the principle, every effort will be made to produce a



Trucks hauling captured guns into town from Champagne battlefield



Trucks are used in France to carry women and children out of the war zone

better and more refined product than the American.

Even in England, the majority of motorists picture their own car factories as entirely engaged on the production of munitions. Speaking quite broadly they are, but nevertheless a number of firms are still able to "keep their hands in" by making cars, and a few are still being made and sold to the public.

New Model Development

In chief factories it has been found possible to do something in regard to new models, or redesigning the pre-war existing ones and bring them up to date. Quite a number of actual new cars are on the road for test at the present time. It is, however, more important to know that the quality of these firms is first rate. Among such cases are to be numbered several of the leading firms in Britain, though as the new cars are commercial secrets, we cannot refer to them by name. A very famous firm has an entirely new design of small car, a la Ford, so far as the idea of providing the maximum for a minimum outlay is concerned. It probably will be sold at a good deal less than half the cost of the cheapest car previously sold by the firm in question.

Acceleration and hill climbing are both markedly good characteristics, and the initial cost and upkeep are both low.

Two firms, with well-known racing records, also have produced entirely new models. In one case it is a small car—much smaller and cheaper than the firm has previously produced, and in the other case it is a much larger and more luxurious car. Then there is another firm that

specialize on one model only, and a very popular one before the war—which has brought out an improved form of the same general design, but rather larger and more commodious, and with a number of improvements. This firm is also carefully nurturing plans for a quick continuation of its ordinary business routine so soon as the war is over, and its expectations of a large sale for the new model in all probability will be fully realized.

One more case as indicative of the general trend in England may be cited and it is an important new entrant into the field of car production. A large firm of accessory manufacturers has just got the first chassis of its new venture on the road, and the preliminary trials have been quite satisfactory. It is a small car largely on conventional lines, but with a new system of rear suspension which prevents the chassis from being orthodox.

It will be seen that the idea so prevalent that England is not, and cannot, do anything to keep pace with motor car progress, is far removed from fact. Naturally everything is being kept very dark, as no good purpose could be served by announcing any of the newcomers at the present

time. However, in general terms, it may be said that British motor car factories are keenly alive to their interests and the quick recovery of their good will as soon as the war is over. In several cases, cut and dried programs already are fixed, and in other interesting innovations and experiments are being tried out. In all cases of importance, activity as to the future car market is prevalent though, perhaps, not superficially apparent.

FRENCH MOTOR LAWS LESS STRICT

Paris, Nov. 26—Continuing the relaxation of motor car restrictions outside the actual army zone, the military authorities have given orders that the gates of Paris shall remain open to motorists until midnight instead of 10 o'clock, as previously. After 12 o'clock only taxicabs without passengers aboard, and going to or from their garages, are allowed through the city gates.

The annual motor car census, to take place this year during the month of December, will be more stringent than usual. Every owner is under an obligation to declare his car to the local authorities, who communicate the lists to the military, and in addition the police and gendarmes have been instructed to keep a look out for hidden cars or trucks. For several months there have been few or no requisitions of private cars, for the army is able to obtain a reasonable number of touring cars from the home factories and supplies from America are available, if required.

Unless there are several unexpected developments, it is doubtful if the private car owner in France will receive any further attentions from the military. The military registration scheme, which allowed any man's car to be seized at a moment's notice was very useful in the first rush of the war, but now that fighting has become almost an established business, it is found more advantageous to go to the factories rather than to individual owners.

Regulations regarding touring are also less stringent outside the active war zone. Instead of fortnightly passes, monthly military passes now are given to car owners. These passes are asked for by the police every time a car goes through the gates of Paris, but on the open road they only are required to be presented at rare intervals, and principally in directions



French troops boarding trucks preparatory to trip to the trenches

leading to the war zone. In the centre, west, south, and southwest parts of France there are hardly any more restrictions than under peace conditions. A register is maintained in each district of all motor car passes issued, and if any driver is reported as having made an illegal use of his pass, he is caught when he presents himself for monthly renewal. The very simple remedy is to refuse to renew the pass, and as no driver dare run without a permit, an effective control is maintained.

For the war zone, exceptionally stringent regulations are in force. Civilian motorists can only travel in this district on obtaining a pass issued by the commanding officer, bearing the photograph and signature of the driver and each passenger, the number of the car and the precise itinerary to be followed. Each military driver, not forming part of a convoy, also must possess a special pass, renewable at frequent intervals. As there are guards along the roads with orders to stop all cars, whether carrying civilians, private soldiers or officers, it appears to be impossible for any unauthorized person to travel by motor car in the war zone of France. Any attempt to break through or to get through with a false pass would entail the confiscation of the car and court martial.

MAXWELL COVERS 8,626.7 MILES

Los Angeles, Cal., Dec. 10—With a total of 8,626.7 miles covered since noon November 22, the Maxwell "25" which is making an attempt to establish a new world's non-motor-stop record is now well on the second half of the record run. Since the start, a driver and observer appointed by the local A. A. A. representative have been in the car and not once has the motor stopped.

A puncture made one tire change necessary but there has been no other stop except for oil, gas and water at the regular control where the supplies taken on have been recorded by the observer on duty and in most cases by the one to go on the next 8-hour shift. The car has run off the mileage in the city and out on the county boulevards.

The present non-motor-stop record is 12,404.9 miles, made in San Francisco more than 2 years ago. This will be increased by the five-passenger Maxwell, according to the local representative and factory officials. It is planned to establish a new record and then send the car on a tour.

Attack Motor Taxation

Senators and Congressmen Declare They'll Oppose Proposed Horsepower Levy

Texas Solon Comes Out Supporting President's Recommendation

WASHINGTON, D. C., Dec. 11—A hornet's nest has been stirred up by President Woodrow Wilson in his message to Congress advocating a tax on motor cars and gasoline. It is known that many members of Congress are agreed that such a tax would be unpopular throughout the country and if a bill, embodying such a plan, is presented to Congress it will have a hard row to reach enactment into law.

Just to show how some members of Congress stand on the proposition the correspondent of Motor Age has secured the following expressions of opinion from Congressional leaders:

"I believe it unjust to suggest the taxation of motor cars, thus putting a burden on a great industry now bringing millions into the country. I shall make a vigorous fight on the proposal," said Senator Townsend, of Michigan. Senator Townsend is one of the senate leaders and wields much influence in the upper body of Congress.

Representative Steele, an Iowa democrat, is absolutely opposed to the proposition of taxing cars and gasoline. "All

such a tax except in war times. I oppose motor car and gasoline taxes," he announced.

"Count me against gasoline and motor car taxes," said Congressman Tamm, a Democratic representative from Illinois.

Congressman Sloan, a Republican representative from Nebraska, claims that gasoline and motor car taxes would be extremely unpopular in his state. "Half our farmers own machines," he added.

Of course, somebody has to be in favor of the president's proposition, and it has remained for Congressman Gregg, of Texas, to make public announcement of his stand on the subject. "I don't see why motor cars should not be taxed," he declared. "Everything else has been taxed and why not motor cars."

The matter will not come before Congress until the new year, as Congress is about to adjourn for the holiday season. It is expected that if a bill is introduced embracing the president's taxation ideas, Congress will be flooded with protests against the proposition.

OHIO PROTESTS HORSEPOWER TAX

Cleveland, O., Dec. 15—Should the recommendation of President Wilson for a tax of 50 cents per horsepower on motor cars be enacted into a law, it is believed here that the burden will fall upon the owners rather than the producers of cars. In Ohio it is said that the tax will fall heavily upon farmers, as 50 per cent of the output of cars this year has been sold to them. In addition to this would be the tax of 1 cent a gallon on gasoline.

Directors of the Cleveland Automobile Show Co. discussed this matter at a meeting held recently to complete preparations for the show. Manufacturers said they are interested in it to the extent that such a tax will limit the sales of cars by making the ownership a burden.

Secretary Fred H. Caley of the Cleveland Automobile Club said that taxes and fees in this state now amount to \$17.75 on an average, fixing the value at \$850. The

average horsepower is about thirty. This would add \$15 more. It is estimated that the consumption of gasoline is 500 gallons annually to each machine, which would mean another \$5, or a total of \$37.75.

Cleveland alone has 26,000 cars and in the state there are about 182,000, besides 2,500 dealers and fifty-two manufacturers, few of which favor greater taxation.



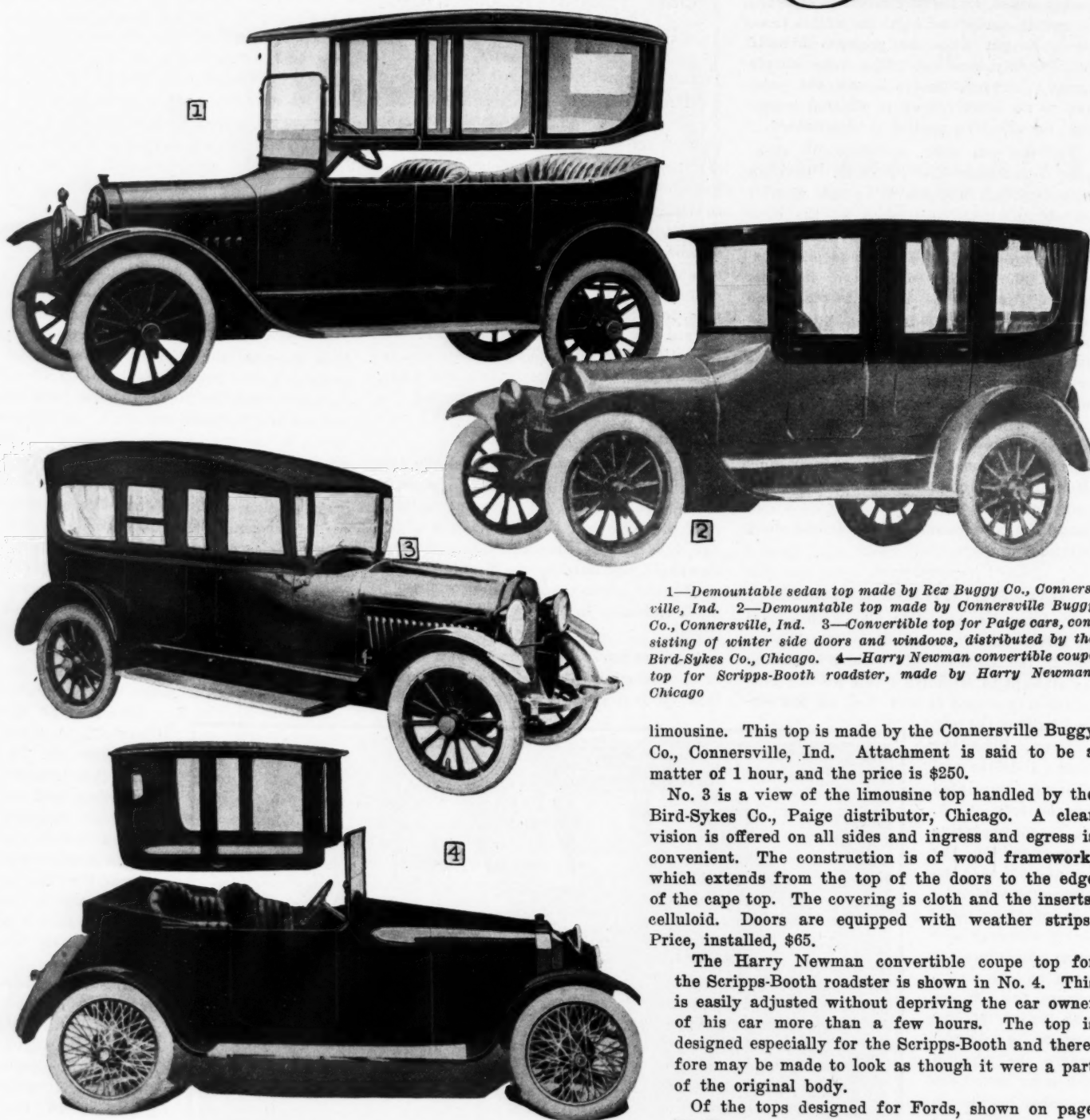
Doctor's private car transformed into military ambulance

our farmers are motorists and they never will stand for such a tax," he declared.

"You can depend on it that no motor car or gasoline tax will be levied by this Congress," says Congressman Miller, a Republican representative of Minnesota.

Congressman Humphrey, a Republican, of Washington, said he was against all direct taxes. "There is no necessity for

Winter Tops for Touring Cars



1—Demountable sedan top made by Rex Buggy Co., Connersville, Ind. 2—Demountable top made by Connersville Buggy Co., Connersville, Ind. 3—Convertible top for Paige cars, consisting of winter side doors and windows, distributed by the Bird-Sykes Co., Chicago. 4—Harry Newman convertible coupe top for Scripps-Booth roadster, made by Harry Newman, Chicago

limousine. This top is made by the Connersville Buggy Co., Connersville, Ind. Attachment is said to be a matter of 1 hour, and the price is \$250.

No. 3 is a view of the limousine top handled by the Bird-Sykes Co., Paige distributor, Chicago. A clear vision is offered on all sides and ingress and egress is convenient. The construction is of wood framework, which extends from the top of the doors to the edge of the cape top. The covering is cloth and the inserts, celluloid. Doors are equipped with weather strips. Price, installed, \$65.

The Harry Newman convertible coupe top for the Scripps-Booth roadster is shown in No. 4. This is easily adjusted without depriving the car owner of his car more than a few hours. The top is designed especially for the Scripps-Booth and therefore may be made to look as though it were a part of the original body.

Of the tops designed for Fords, shown on page 27, No. 1 is made by the American Top Co., Jackson, Mich., and is designed for an entirely inclosed car. No. 2 is the All-Season limousine top, made by the Wadsworth Mfg. Co., Detroit, Mich. The rear panels are steel and the posts at the windshield is of japanned steel. The price is \$60. Where these tops are used with 1913 or 1914 Fords a combination cowl dash is furnished at \$12 extra.

No. 3 is the Topford detachable limousine top, which is said to be easily and quickly attached, a hammer, wrench and screw driver being all the tools necessary. The price for the top shown is \$175, and there is one for the runabout at \$125. These are made by the Topford Detachable Limousine Co., Inc., Hempstead, N. Y.

The Mandel limosette, shown in No. 4, is made of kiln-dried

WITH the coming of winter car owners are giving more thought toward converting their touring cars and roadsters into cold weather vehicles and a diversity of types for application to various makes of cars are offered by the top makers. On this page are shown a variety of styles for application to cars in general, while on the opposite page is shown a number of types designed exclusively for use on Fords.

In No. 1 on this page is shown the Rex top over a five-passenger Empire touring car. This sedan type made by the Rex Buggy Co., Connersville, Ind., is easily attached to the car as the top irons fit in the regular irons used for a one-man top, while the front of the Rex sedan is fastened to the regular windshield. No. 2 shows a demountable top for turning the car into a



1—Winter top for Ford cars, made by American Top Co., Jackson, Mich. 2—All Season Limousine top made by Wadsworth Mfg. Co., Detroit, Mich. 3—Limousine top for Fords, made by Topford Detachable Limousine Co., Inc., Hempstead, N. Y. 4—The Mandel Limosette, made by the Mandel Limousine Co., Chicago.

lumber, metal and glass and is built by the Mandel Limousine Co., Chicago, exclusively for 1913-14 and -15 Fords. The product of the Anchor Buggy Co., Cincinnati, O., shown in No. 5, is one of two types of top made by that concern. Another, besides the sedan shown, is for the Ford roadster, converting it into a coupe. The Anchor sedan sells for \$57.50 and the coupe, \$47.50. The de luxe sedan, shown in No. 6, is made by Irvin Robbins & Co., Indianapolis, Ind., and is of well seasoned, three-ply veneer and plate glass.

No. 7 shows the A-W All-Weather convertible top, made by the Adams-Williams Mfg. Co., New York. This concern lists its top for Ford touring cars at \$75.

A wide range in variety is offered by the top manufacturers so that the most fastidious car owner may choose a style that suits his individual taste. The more inexpensive winter tops consist largely of curtains with provision being made for ready getting in and out of the car. When one wishes to get a built-up top then the price naturally goes through a step-up process that corresponds with the fancies of the individual car owner.

5—Anchor sedan top for Fords, made by the Anchor Buggy Co., Cincinnati, O. 6—Robbins sedan top for Fords, made by Irvin Robbins & Co., Indianapolis, Ind. 7—A-W All-Weather convertible top made by the Adams-Williams Mfg. Co., New York



The Readers' Clearing House



EXPLAINS PLANETARY GEARSET Woman Offers Key to Solution for the Amateur Student

CAMBRIDGE, Mass.—Editor Motor Age—From time to time I note in the Readers' Clearing House a request from some Ford owner for an explanation of the Ford planetary transmission, but your answers to the same do not throw much light on the subject to the uninitiated. I am aware that this transmission is more difficult to explain to an amateur than the fourth dimension, for I never yet came across a motor expert who could explain it lucidly to me. I shall, therefore, not attempt that baffling task, but I offer the following key to the mystery which may help your amateur Ford readers to puzzle it out for themselves.

The duplicate triple gears mounted on spindles attached to the flywheel control the direction in which the driving shaft turns, in the first speed and the reverse, and like the planets, have two simultaneous motions. One is imparted by the flywheel and carries them around the shaft, say clockwise, and the other is imparted by the sleeve gears on the shaft, with

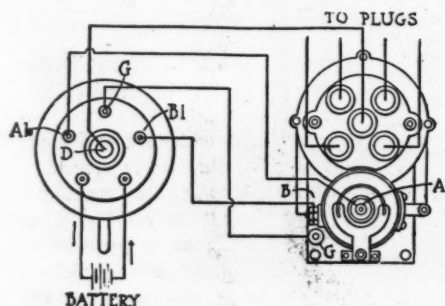


FIG. 1—SPLITDORF LOW-TENSION
MAGNETO

Showing connections of instrument and coil

which they are always in mesh, and which force them to turn on their own spindles counter-clockwise. By an ingenious mechanism these driving gears can be made to revolve faster than the flywheel, and then their own counter-clockwise motion overcomes the clockwise motion of the flywheel and turns the shaft the other way, at a reduced rate of speed, giving the reverse drive.

Another similar device can make the driving gears revolve at a slower rate of speed than the flywheel in which case they merely neutralize a part of the clockwise motion of the flywheel and produce a slower clockwise motion, giving the first speed.

The mechanism by which these changes are made, though complicated, is very easy to understand if the fact of the simultaneous double motion is kept in mind, and the

Short-Sighted Garage Owner

BENTON HARBOR, Mich.—Editor Motor Age—I am a garageman and mechanic and as a subscriber to and reader of Motor Age would like to say a few words in defense of the repairman. Twelve years' experience in leading shops backs me in my contention. If Motor Age were to ask any garage owner his views in regard to his repair shop, he would tell you that there is very little if any money in it, and for that reason will not pay men, who have spent years of study in the repair of cars, sufficient money to make it worth their while to work for him. He will fill his shop with \$12, \$15 and \$18 men, expecting them to do work which requires the attention of an expert. He does not think that nine-tenths of lost or dissatisfied customers can be traced to his repair shop where his inferior help did poor work.—Jack Hale.

problem worked out from the flywheel towards the drums instead of the other way as is generally done in studying this.—Rose Fay Thomas.

SPRINGS AND SHACKLES ADEQUATE

Hotchkiss Type of Drive Designed to Take Care of Braking Strains

Chicago—Editor Motor Age—Will Motor Age kindly give an opinion regarding a rear axle that is supported only by underslung 54-inch semi-elliptic spring and the driving shaft?

2—Would the absence of torsion rods cause an excessive strain upon the spring shackles and have a like tendency upon the driving shaft, especially in brake service?

3—Would this be a reason for causing a car so constructed to skid?—W. D. C.

1—The Hotchkiss type of drive, to which you refer, is not an experiment by any means, having been used in cars of foreign make as well as in several well-known American cars, and it is a construction that is apparently coming more and more into use where lightness of chassis is desired. In fact, there is one truck manufacturer, to our knowledge, who is using such a drive without torsion tubes, arms or rods, and after a long period of trial with it this maker finds no reason to give it up. If it will prove out in truck installations, it certainly ought to be applicable to passenger vehicles where the loads and driving strains are much less.

2—Where the Hotchkiss drive is employed, the master leaf of each rear spring is made strong enough to take care of the added duties of receiving the drive and torque, and besides this, the shackles and other parts are also designed with their added work in view. The matter of braking strains has also been carefully considered, and you are safe in relying upon the engineering ability of the men who have designed such a drive. Among the concerns which have been very successful with this form of drive are Hudson, Oakland, Oldsmobile, etc.

3—No.

REMEDY FOR LEAKING RINGS Reader Tries Experiment that Results Favorably for Him

Amarillo, Tex.—Editor Motor Age—I note that many of your readers are having trouble with cylinders leaking oil and also the same trouble after installing some good make of non-leaking ring. This is mostly the trouble in a Ford car, as your queries have shown, especially in the front cylinder.

Now I am the proud possessor of a Ford car, 1912 model, that has had hard service and about 4 months ago the front cylinder leaked oil so badly that I would have to clean the plug about every 5 miles so I took the engine down and installed a complete set of non-leaking rings, three to each piston also oversize pistons to take up the play. After I assembled the car the trouble was just the same even after a week or 10 days. I ran it thinking to give the rings a chance to smooth up and seat themselves. I knew that the trouble was mainly in the cylinders being out of round and in order to make the rings seat in the low side I would have to have the cylinders rebored or try some other plan. So for the benefit of others who may have this trouble, I tried a "fool's trick" to see the results, if possible.

I took a small amount of fine clover grinding compound and mixed it with kerosene about ½ teaspoonful to a teacup of kerosene and after mixing thoroughly put same in a long spout oil can. I then removed the spark plug and after shaking up the can I squirted some all around the piston and started the car on the other three cylinders, leaving the front plug out so that this mixture would not be blown out through the exhaust valve. I let the car run slowly for about 30 minutes applying the mixture three or four times. At the end of that time I washed out the cylinder with kerosene, also drained out the old oil and placed ½ gallon kerosene in the crankcase and let the engine run for about 30 minutes slowly to remove every particle of compound possible. After draining off the kerosene, I filled the crankcase to ½ inch above top pet cock and started the car and ran it about 10 miles at about 20 miles per hour and coming back at faster speed than that and even with this excess of oil and the engine hot also it failed to show but a faint blue smoke at the exhaust. I next tried the lightest grade of lubricating oil with the same results and I have been running the car ever since and the plugs have not been cleaned. I have removed the head plug twice to see if it is O. K. and it is still clean and the points as good as when I

put it in the car. I hope this test may be of interest to some reader who is having trouble.—Frank Wharton.

TRouble WITH OLD-STYLE CLUTCH Regular Gasoline Carbureter Will Not Operate on Kerosene Satisfactorily

Omaha, Neb.—Editor Motor Age—I have a 1912 Maxwell, model "Special," which has given good service with the exception of the clutch shifter collar, which wears rough, destroying its ball bearings. This trouble causes a grinding noise very noticeable in the front seat when the clutch pedal is depressed. The first collar broke on the road, causing a long run on low gear. I secured a stock repair, which soon developed the same noise and was found when removed to be on the verge of breaking. I then had a new and heavier part made by a local machinist, and while chances of breakage have been greatly reduced, the grinding noise comes back, and renewals of cups, balls and cones give only temporary relief. Clutch and motor use the same oil, so a medium cylinder oil is in the clutch case. Does Motor Age know of any relief for this clutch? Would some ball bearing manufacturer make me a cup and cone to order of more serviceable steel? Could the clutch spring be too stiff? Would Motor Age advise shortening the inlet manifold on this motor? Will my Stromberg type B use coal oil as fuel? If not, what carbureter will? What precaution may be taken against a breakdown due to a burnt Splitdorf coil?—Subscriber.

If you are sure the clutch is properly assembled and has sufficient lubrication, it would seem that the only remedy is a different construction of the part or the replacing with better materials. As this car was designed and built by a company now out of business, no later models of the car were built in which the fault, if it is a fault, were corrected, and hence there is no later construction which could replace it unless the present Maxwell company has changed the design for the benefit of cars having such a trouble. However, it is most advisable to write direct to the Maxwell Motor Sales Corp. at Newcastle, Ind., and as they have experts that know this particular car intimately, they can undoubtedly tell you where the difficulty lies and how to remedy it. They can also supply you with replacement parts for it, which would undoubtedly be better than some you would have made by a local machinist, no matter how good.

It would not be advisable to shorten the manifold. Your Stromberg will not use kerosene. There are several carbureters made to use kerosene, among them being the Harroun and the K-C-B. If the coil should burn out, you would have to resort to battery ignition, providing you had a dual or double ignition system. If there is no battery ignition on the car, there is nothing to do but repair the coil before you can proceed.

Heat Treatment of Springs

Rockdale, Tex.—Editor Motor Age—Kindly explain how to temper a spring.—Rockdale Motor Car Co.

The exact heat treatment to be given a spring steel depends on the composition. However, assuming that the steel is a .95 carbon steel, which, according to the Society of Automobile Engineers, is a grade of steel used generally for springs, the treatment after shaping or coiling, as the case may be, is as follows:

1. Heat to 1,425 degrees—1,475 degrees Fahrenheit.
2. Quench in oil.

3. Reheat to 400 degrees—900 degrees Fahrenheit, in accordance with the degree of temper desired, and then cool very slowly.

In commenting upon this heat treatment, the Society of Automobile Engineers says: "It must be understood that the higher the drawing temperature (operation 3) the lower will be the yield point of the material. On the other hand, if the material be drawn at too low a temperature, it will be brittle. A few practical trials will locate the best temper for any given shape or size."

It should also be borne in mind that the heat treating of springs is usually entrusted to the springmaker, and unless absolutely necessary for the work to be done, and by someone who knows this kind of work, it is advisable to refrain from doing it. Inexperienced persons are apt to ruin the material.

CARBON BENEFITS KNIGHT ENGINE Some Questions Relating to Buick Model 37—Adjusting Marvel Carbureter

Nellsville, Wis.—Editor Motor Age—How can one adjust a Marvel carbureter installed on a model C37 Buick. The adjustment as given in a previous issue does not apply to this model.

2—How many revolutions per minute should this motor run to develop 37 horsepower?

3—To what wires should an ammeter be connected on this model?

4—Explain why and how carbon is beneficial to a Knight motor.

5—Is there a correspondence motor car school?—Lloyd Watters.

1—A sectional view of the Marvel Model E. carbureter is shown in Fig. 2. On examining it, you will observe that there are only two adjustments with which you are concerned in setting it for correct running of the motor. These are the air adjusting screw A and the needle valve N. In order to have some point to start from, it is best to turn needle valve N to the right until it is completely closed, and also to turn the air adjustment A to the left until it stops. Now give the air adjusting screw A three complete turns to the right, and open needle valve N two complete turns to the left. Then start the engine and close the throttle until the motor runs slowly and verify the needle valve adjustment by turning it to the right a little at a time until the engine works smoothly and evenly. With this done, let

the engine run until it is thoroughly warmed up. When sufficiently warmed, turn screw A to the left a little at a time until the engine begins to slow down. This indicates that the air valve spring is too loosely adjusted; meaning that you should turn it back to the right just enough to make the engine run well. Now advance the spark and open the throttle very quickly.

If the adjustment is correct, the engine should pick up at once without hesitation. If there is missing or popping in the carbureter, this indicates that the mixture is too lean, and the needle valve N should be opened slightly more. It is best to leave the air adjustment A religiously alone now, unless it appears absolutely necessary to further adjust it. The best possible adjustment has been secured when air adjustment A is turned as far as possible to the left, and the needle valve is turned as far as possible to the right, pro-

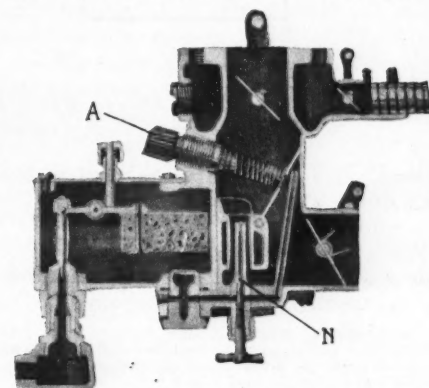


FIG. 2—SECTION OF MARVEL CARBURETER
Showing the points of adjustment

viding the motor runs smoothly and picks up quickly when the throttle is opened.

2—This motor attains its maximum horsepower output at about 1,750 r. p. m.

3—Refer to the diagram on page 35 of the September 23, 1915, issue of Motor Age. Cut the red wire that runs from the generator to the switch and insert the ammeter across the line.

4—When carbon forms on the sleeves of a Knight motor it simply serves to seal them against compression leakage. One sleeve works within the other, and these work within the cylinder between its walls and the piston. The carbon is said to help these surfaces compression tight. Carbon also serves to give the contact surfaces a glass-like finish, tending to make the sleeves and pistons run smoother in continued service, it is claimed.

5—There are several. List by personal letter.

Diagram for Splitdorf Type T

Alberta, Can.—Editor Motor Age—Kindly give me wiring diagram of a type T Splitdorf magneto with a dash transformer having six contacts and a five-point switch with push button, showing how the switch is connected to the various windings of the coil.—A. M. C.

As we understand your query, the diagram shown in Fig. 1 is what you require. But if it is not, Motor Age would be glad to comply with your further re-

Communications Received and Inquiries Answered

Rose Fay Thomas.....	Cambridge, Mass.
Jack Hale.....	Benton Harbor, Mich.
W. D. C.....	Chicago
Frank Wharton.....	Amarillo, Tex.
Subscriber.....	Omaha, Neb.
Rockdale Motor Car Co....	Rockdale, Tex.
A. M. C.....	Alberta, Can.
Lloyd Watters.....	Nellsville, Wis.
V. H. Hellen.....	Minneapolis, Minn.
A Reader.....	Goshen, Ind.
Reader.....	Chicago
H. M. Whitney.....	Wenona, Ill.
C. L. M.....	Casper, Wyo.
Fred E. Koch.....	Chicago
R. T. O'Brien.....	Akron, O.
Herman F. Horne.....	Kaukauna, Wis.

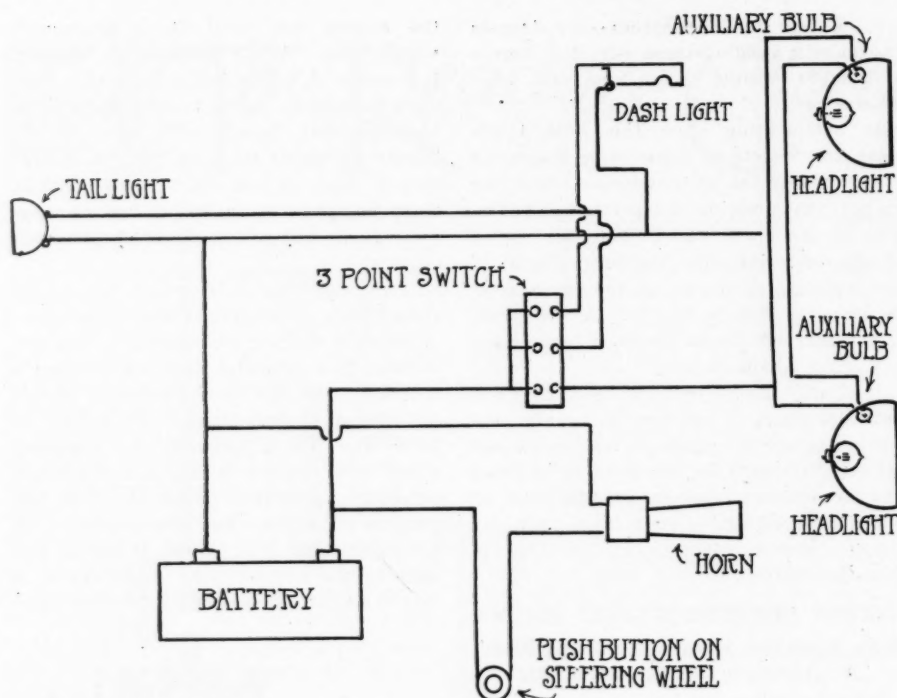


FIG. 3—WIRING FORD FOR BATTERY

How to connect for lights and horn

quests, providing you make your wants sufficiently clear.

SOME ELECTRICAL INFORMATION

Eight and Twelve-Cylinder Engines Have Overlapping Power Impulses

Minneapolis, Minn.—Editor Motor Age—Explain the positive and negative of batteries.

2—Would it make any difference if these wires were crossed and why?

3—In most four-cylinder motors they fire 1-2-4-3 and the marks on the flywheel are always 1-4 and 2-3 together. Explain how to set the spark so as to fire on No. 1 and how does one know when No. 1 is supposed to fire and not No. 4? Also sixes.

4—Explain the meaning of "checking up the spark" on a six with an Atwater-Kent system, and how to do it.

5—Is an eight-cylinder motor four cycle? And do the explosions overlap?

6—Is a twelve-cylinder motor four cycle? And do the explosions overlap?

7—Explain how to find the positive and negative wires coming from the switch where the car uses dry batteries to start on, or how to tell them.—V. H. Hellen.

1—When an electric current goes through any non-metallic liquid which is capable of carrying electricity, the liquid is chemically decomposed, resulting in either the splitting up of the chemical combinations or the forming of new chemical combinations. This is called electrolysis. One part of the dissociated liquid is liberated at the point where the current enters, and the other part where it leaves. If we pass a current through water, as an example, the oxygen gas is freed where the current enters, and hydrogen gas where it leaves. The conductors that lead the current in and out of the liquid, such as the electrolyte of a battery, are called the electrodes, and the one at which the current enters is the positive electrode, and that at which the current goes out, the negative.

2—If the wires were crossed, there would be what is termed a short circuit. Then the electrical energy would emerge from, and re-enter the battery without doing any

work, and the result would be the conversion of this energy into heat, quick discharge of the battery and possible burning off of some of the wires.

3—You can tell which is in firing position by opening the petcock of that cylinder and feeling with the finger whether or not the piston is coming up on compression.

4—Checking up the spark simply means determining whether or not the plugs are firing at the right time. To do it, first retard the spark lever as far as possible. Then disconnect the wire from No. 1 spark plug, and when holding the end of the wire $\frac{1}{8}$ inch away from the plug terminal or from the cylinder casting note whether a spark jumps the gap at the instant the No. 1 cylinder is at upper dead center on the compression stroke. This can be determined as mentioned above. If it does not spark at that time, you know the timing is incorrect.

5. and 6—Both eights and twelves are four-cycle engines, and the explosions overlap. There is greater overlapping in a twelve than an eight.

7—In determining which is the positive and which the negative wire, it is often found expedient to immerse the ends of the wires in a salt solution when the current is on. When held a short distance apart, bubbles will arise from the negative terminal.

SMALL CARBURETER NOT ADVISED

Not a Good Idea to Tamper With Instrument, Although Jacketing Advisable

Goshen, Ind.—Editor Motor Age—I have a Northway 4 by 4 motor, fitted with a $1\frac{1}{2}$ -inch model L Schebler carbureter. The engine will pull well except on a long slow pull; it will pull quite well for about one and one-half blocks, when it will fall down, begin missing and gray smoke is thrown off by the exhaust.

The same thing occurs on the level when pulling in sand or mud.

I changed the carbureter for a somewhat smaller model of the same make, which improved the pulling qualities of the motor, but it would not idle slowly or throttle down slowly on the road. Am I right in assuming that poor carburetion is the cause of this trouble? I have had both air intakes to the carbureter piped to the hot air. What remedy does Motor Age suggest?

The carbureter has a waterjacket, but it is not filled. The motor has no pump and I do not think the circulation would be strong enough to warm the jacket. I wish to make the holes larger in the jacket and pipe it to the exhaust. Is this practical? Will it fill up quickly with soot? I also wish to solder a coarse screen, $\frac{1}{8}$ or $\frac{1}{4}$ -inch mesh, inside the carbureter at the jacket, expecting these wires to carry heat from the hot jacket. Is this practical? Will this burn kerosene after it has been heated on gasoline?

2—What are the disadvantages of burning kerosene? Am told it causes gumming of the valves.—A Reader.

1—From what information you have given, it appears that you have not the proper adjustment of the carbureter for low speeds, it being too rich. Try adjusting it for a leaner mixture for low-speed work. Motor Age does not take kindly to the idea of putting on a smaller carbureter. That might be the trouble in itself. It might also be that the float lever is wrong, allowing the carbureter to flood and choke. Loading of this kind is almost sure to come from improper adjustment. It would be all right to use the heat of the exhaust, having an air scoop or stove on the exhaust pipe. There is no occasion for soot to get in, as you would only be using hot air. But do not do anything so foolish as to solder screens inside the carbureter to heat it. Such would not do any good, and might do a lot of harm, impeding the flow of the gas, and a screen would not carry any heat to the fuel. The jacketing of the mixing chamber would be sufficient to get all the vaporization you need. It is doubtful if you could use kerosene satisfactorily, as much from the effect it would have on the engine as on its successful carburetion.

2—Kerosene would cause excessive carbonization in the average motor, and would undoubtedly gum the valves in time.

FORD MAGNETO AN ALTERNATOR

Cannot Use Storage Battery Successfully with This Kind of Current

Chicago—Editor Motor Age—Pursuant to conversation the writer had with your office this afternoon we would appreciate very much if you would secure for us map or chart similar to ones shown in your journal showing wiring system for Ford car, suitable for two headlights—with one large and one small light in each—one rear tail lamp, one dash lamp and one electric horn. It is our intention to use power from generator when car is running and when still use power from a storage battery.—Reader.

Due to the fact that the Ford magneto-generator produces an alternating current, it would be impossible to put a storage battery in the same circuit with it. But you could carry a storage battery on an independent circuit satisfactorily, using it to light the tail lamp, dash light and small bulbs in the headlights, simply connecting the Ford generator terminals to the main headlights as they are connected where only one set of bulbs are used. To do this, you would have to be absolutely sure that there was no connection between the two

sets of bulbs in the headlights. Fig. C gives you a wiring diagram for the auxiliary bulbs in the headlights, for a horn, and for dash and tail light. You would have to draw constantly on the storage battery for the current used by the tail lamp, and also the dash lamp when lit. The dash lamp is connected so that it will be lit by a separate switch button, while another button controls the headlight auxiliary lamps, and another takes care of the tail lamp. A separate push button completes the horn circuit independently of the light circuits.

THE PISTONS SEEM TO BE WORN Best to Leave Them Alone Since Compression Is Good

Wenona, Ill.—Editor Motor Age—I have a 1912 Ford which has been run 20,000 miles, oiling never neglected, and the main bearings perfectly tight, but the pistons seem to be worn some; that is, they can be rocked some, as they protrude through the cylinder top. Does this indicate worn pistons or worn cylinders? Would Motor Age advise new pistons standard or .025 oversize? If oversize could a good job be done by lapping them in and should the old pistons with the rings on be used in lapping the new pistons in? All twelve piston rings now in are bright and the compression good, but the engine vibrates some and there is a slap that I think is due to the above cause. I wish to do this work myself, so kindly advise me. Would Motor Age recommend Atwater-Kent or similar ignition in preference to the regular Ford? If so, why?—H. M. Whitney.

From what you say about the pistons, and from the fact that the compression is good, Motor Age sees no cause for alarm, and would advise letting them alone until such a time as they do give trouble. If they are too loose, and you are sure the noise is piston slap, the only remedy undoubtedly is new pistons slightly oversize to take care of the cylinder wear. Possibly, however, the pistons are somewhat undersize at the present time, and if you put in a new set of standard Ford pistons, they will be tight enough for the engine, and will eliminate the noise. Because you can rock the pistons slightly when they protrude through the top of the cylinder casting is no sure sign that they are not of the right size.

How would you lap the new pistons in with the old? Lapping means to run them in thoroughly in their cylinders, and we cannot see what you mean. If you put new pistons in, run the motor for several hours by outside power, such as a belt over the flywheel face, this serving to fit them to the cylinders in good shape. Use plenty of oil while running them in.

The ignition you have on the Ford is satisfactory, but many motorists are fitting some of the special types similar to that you mention. Special fittings are provided for attachment to the Ford.

HERE'S ANOTHER SPEED MERCHANT He's After a Cadillac This Time—Some of the Things Not to Do

Casper, Wyo.—Editor Motor Age—Would like some information on rebuilding a 1914 five-passenger Cadillac in order to obtain more speed. I want to put on a speedster body. Advise me whether or not to change the carburetor, enlarge the valves, put more weight on the flywheel and what provision should be made for better lubrication. Would a magneto give better ignition.—C. L. M.

Motor Age is not very much in sympathy

with the prevalent idea that any car can be redesigned to make it have more speed. The Cadillac in question is good for close to 60 miles an hour, and with a lighter body of the speedster type, it ought to do even better than with a heavier touring body. However, when it comes to altering the valves, changing the ignition, carburetor and flywheel, it seems time to draw the line, because you would find that after you had finished all of these changes your engine would not work satisfactorily. It was not designed in the first place for any such alterations, and they would be like putting patches on a coat to try to make it look like a new one.

The Delco ignition, with which this car is fitted, has been used successfully for very high speed work, recent tests with the Cadillac eight being an example of its speed possibilities.

The Cadillac carburetor was specially designed for this motor, and it is doubtful if any other make, not particularly adapted to the peculiarities of the engine, would work to any more advantage. As to changing the valves, this would hardly pay for the effort.

The present valves are of the best size for the engine as they are. The same applies to the flywheel. You might, however, put in aluminum pistons without altering the design in any way, and then on these pistons you could use some of the newer types of anti-leak rings to give you more compression along with lighter reciprocating parts. Then the timing might be altered a little, causing the inlet valves to open slightly earlier, and the exhausts to close later. The best valve timing would have to be determined by trial on the track.

Other than these changes we do not advise any alterations of the engine. The spark might also be advanced somewhat with good results for speed work. Let the oiling system alone, but use plenty of oil for high speed running.

Designing An Electro-Magnet

Akron, O.—Editor Motor Age—What is the most effective ratio of diameter to length of a

solenoid magnet when the distance that its armature does not exceed $\frac{1}{2}$ -inch?

2—Give the simplest formula, and an example of its application, for winding a solenoid when the pressure to be exerted is 40 pounds working through a distance of $\frac{1}{2}$ -inch, the amperage, voltage and size of wire used being variable.

3—What book gives a complete treatise on solenoid magnets?—R. T. O'Brien.

1 and 2—There is no definite relation between the length and diameter of an electro-magnet for any service. If an engineer were designing a mechanism requiring a magnet such as you mention, he would probably determine the size and length by experiment, as such a problem would be difficult of proper solution in any other way. A good rule to follow, however, is to make the solenoid three times the length of the maximum travel required of it.

This is very general, and might not be the best ratio for your purpose, so that with this as a basis to begin experimenting, you could soon discover what the best size of magnet would be. For the pull of forty pounds, it is certain that the coil would have to be over 1 inch in diameter.

3—We know of no treatise that would help you very much on this specific problem, although most any good work on electrical engineering would cover the subject of electro-magnets in a more or less general way, though dealing with a great many quantities with which you would probably not be familiar unless you know something of electrical engineering.

Remodeled Buick Model 10

Kaukauna, Wis.—Editor Motor Age—Fig. 4 is a sketch of a model 10 Buick after being lengthened 2 feet, making a wheelbase of 115 inches. This change has resulted in a better running car, operates easier, holds the road well, and rides 100 per cent better. Cost of alteration about \$75.—Herman F. Hoehne.

Editor's Note—The design submitted in Fig. 4 shows in detail how the reconstruction of the Buick was accomplished. The tapering of the hood, the lengthening of the frame members, the tilting of the steering wheel and the racy dash all are indicated.

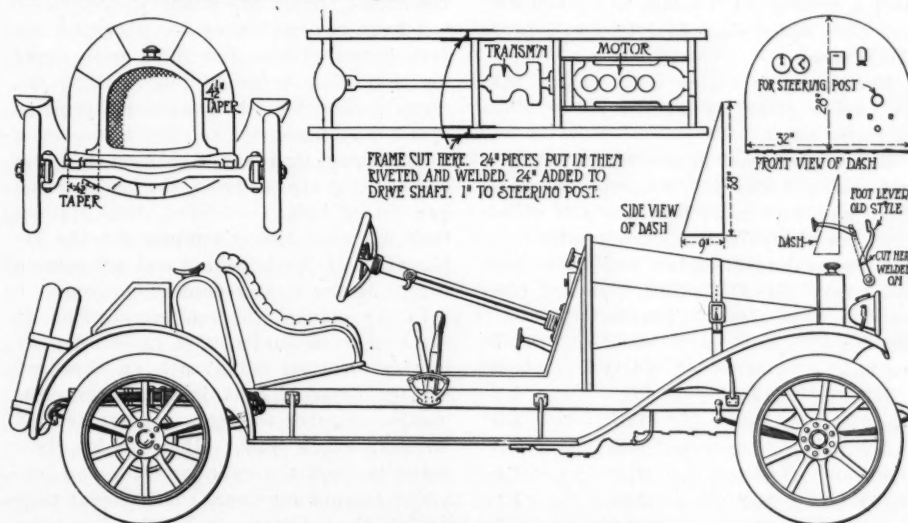


FIG. 4—REMODELING BUICK MODEL 10

Method of lengthening frame and dropping steering wheel

Formation and Effect of Carbon Deposit in Cylinders

THE question of carbon deposit in the cylinders of a gasoline engine is one that has puzzled many since the inception of the motor car. Many hold that this carbon deposit increases the compression in the cylinder and thereby results in an incipient knock. It will not be difficult to prove that this conception is erroneous.

The suggestion is that the carbon forms the combustion space, is gradually reduced and the compression consequently increased, with knocking as the final result. Although this sounds quite logical in theory, there are so many points which in actual practice go against the argument that it seems difficult to understand how it can have stood so long.

In the first place, has anyone ever been able to measure the difference or increase in compression pressure due to a deposit of carbon?

Another writer in a technical journal, to prove his point, assumes a given engine and calculates that the presence of a deposit of carbon $\frac{1}{8}$ inch thick on piston and cylinder head will increase the compression from 70 pounds to 125 pounds. Now, these calculations are easy to make, and so are deductions from them, but although I cannot claim to have made tests with quite so heavy a deposit as an average $\frac{1}{8}$ inch all over, which I consider most excessive, yet I have carried out a series of tests on this subject and personally have always failed to obtain any gauge reading which indicated the slightest increase in pressure.

Readings by O'Kill Gauge

Readings were taken with an O'Kill gauge for measuring cylinder compression, the engine heated up to normal full power conditions, and if any engine tester cares to repeat these tests I am convinced that his results will be identical.

Secondly, if the formation of carbon has no other effect than increasing the compression pressure, we should therefore expect a consequent increase in horsepower; but here again an actual test will prove the reverse.

Every engine tester will confirm that an engine gives its highest power when perfectly clean.

Below are actual figures taken during a test, which, I may add, was repeated many times and with more than one size of engine, but always with similar results.

A four-cylinder engine was used, bore and stroke $3\frac{1}{8} \times 3\frac{3}{8}$ inches, standard compression when clean 70 pounds.

Engine r.p.m.	H. P. Clean	H. P. Dirty	H. P. Lost
750	11.8	10.7	1.1
1,000	15.2	13.7	1.5
1,250	18.8	17.2	1.6
1,500	22.4	21.0	1.4
1,750	25.9	24.8	1.1
2,000	29.1	28.4	.7

It will therefore be seen that instead

Hold Prevailing Conception Erroneous and Cites Tests to Prove Assertions

By C. J. Booth

of an increase in power which we might expect due to the decreased compression space we get a loss of power, which, by the way, could be immediately restored by cleaning the engine.

These figures were obtained with the deposit varying from about $\frac{1}{16}$ to $\frac{1}{8}$ inch in thickness, but it was surprising what a thin film of deposit was sufficient to cause an appreciable loss of power, but as the deposit grew thicker the falling off in power was at a slow rate. This is a most important point to be remembered when considering the action of carbon deposit, as it will be shown later, namely, that it is the fact that the metal is coated with deposit that affects the power and that the actual thickness of the coat is of less importance.

Knocking from Increased Pressure

The third point is this: let us forget that our gauges refused to show any increase in compression pressure, and let us suppose the knocking is caused by the increase in pressure; then if we carefully measure the cubic contents of our reduced combustion chamber, either hydraulically or by measuring the thickness of the deposit, we should be able to clean the engine and, by reducing the thickness of the packing underneath the cylinder, obtain exactly the same cubic contents in our clean combustion chamber as we had in the dirty one. That is to say, we should now have the identical compression conditions that caused the knocking in the dirty engine, and therefore if the excessive compression pressure were the sole cause of the knocking we should still get knocking in the clean engine if all the other conditions remain the same.

I have as a matter of fact repeated this test several times and have even erred on the side of deliberately making the clean engine have a smaller compression space than the dirty one, but was able to demonstrate that the knocking did not occur in the clean engine, the ignition and gas levers being unaltered, this proving that we must look elsewhere for the explanation of the knocking and not assume that it is due to increased compression.

In my opinion the real explanation of the knocks associated with carbon deposit is this: Carbon being such an excellent non-conductor of heat, it causes the combustion chamber to retain a great deal of its heat which would otherwise be dissipated through the cylinder walls and piston if these were clean. This means that during the suction stroke the incoming charge is considerably heated and conse-

quently it expands, with the result that a smaller weight of mixture, or in other words a more attenuated gas, is drawn into the cylinder, with the result that it compresses to a less pressure than the gas drawn into a clean and consequently cooler engine. This, therefore, is the reason that the gauge does not register an increased pressure, and it also accounts for the observed loss of power.

Such a superheated charge is also more prone to spontaneous combustion and therefore will explode or burn more rapidly than a normal charge; consequently, if the ignition is set correct for the latter, the former will cause early ignition, with a consequent knock.

The fact that the difference in time between a quick-burning and a slow-burning mixture, infinitesimal as it is, is sufficient to make all the difference between an early ignition and a correct or late ignition, is well known by the fact that the knocking can be quickly stopped by leaving the ignition timing unaltered and reducing the air supply.

A further point is that the extra heated mixture is also more prone to spontaneous combustion through incandescent particles in the combustion chamber, which in turn may be also caused by the extra heat retained in the cylinder head; this would cause a precisely similar knock, but would not be affected by retarding the spark.

Horsepower Loss vs. Gasoline Reduction

If the theory that the loss of horsepower is due to less gasoline vapor being drawn into the cylinder, then a bench test should show a reduced gasoline consumption, and if this is the case it should confirm the argument. That this does actually happen can be verified by any experienced engine tester.

I made a series of experiments, and although the results of individual tests varied as one would naturally expect, seeing that the amount of difference is slight and consequently requires delicate handling, yet they consistently showed a smaller consumption. Below are the actual results which were averages over a number of tests. The figures quoted are based on the quantity of gasoline consumed per hour, and show the decreased quantity drawn into the dirty engine as a percentage of the quantity used by the clean engine, and these figures can be read in conjunction with the previous table showing the loss of power at the same speeds.

Engine r.p.m.	Gasoline Consumption
750	94.0%
1,000	94.2%
1,250	94.4%
1,500	94.7%
1,750	95.1%
2,000	95.8%

Referring now to the all-important question of preventing the formation of carbon deposit in an engine, it should first

of all be noted that it forms more rapidly in a high compression engine; in fact, carbon will form more slowly in an over-oiled, low-compression engine than in a correctly-oiled, high-compression engine. This I have definitely proved.

Those firms, and there are many, who supply touring models and sporting models, the main and usually only difference in the engine being that the compression is raised in the latter type, invariably find that the sporting type need cleaning more frequently. In one case that I know of they reckon that the high-compression engine requires cleaning about every 8,000 to 10,000 miles, while the standing type will easily last 30,000 miles before getting into the same condition.

The principal cause of the formation of carbon deposit is due to oil working up past the piston into the combustion chamber, although I am of course aware that an over-rich mixture and road dust are also factors in its production, but at present I am only purposing to deal with the main cause.

Why Oil Stays Below Pistons

The reason that oil does work up past the piston is due to several causes:

1. Too much oil fed up into the cylinder walls.
2. Piston rings not being sufficiently effective in keeping the oil down.
3. The engine being run with throttle closed or nearly closed when the engine acts as a pump and draws oil up from the crank chamber.
4. The shape of the piston tops.

The cure for the first complaint is to fit splash guards at the bottom of the cylinders, the shape and size of the hole in these can only be found by trial and experiment, aiming of course at obtaining a mean between over-oiling and under-oiling the cylinder walls.

An old method of preventing complaint No. 2, that is, preventing oil getting past the piston, was to fit very stiff and strong piston rings, which certainly were very effective but had the disadvantage of creating a lot of friction, made a stiff engine and one which soon showed considerable wear on the cylinder walls. A better method is to fit a scraper ring near the bottom of the piston, that is, an extra ring having the sole function of scraping off the excess of oil on the cylinder walls, and it should have a recess or trough immediately below it in which the oil is collected; small holes should also be drilled connecting this recess to the inside of the piston to allow the oil collected to draw away.

The third trouble can be overcome by having an extra air valve on the intake manifold, preferably hand operated, so that when the engine is used as a brake, air is readily admitted to the combustion chamber, and consequently there is no tendency for a partial vacuum to exist above the piston.

With reference to the shape of the piston affecting the question, I have always found that concave tops form more deposit than convex, the reason in my opinion being that the concave tops act like a saucer, collecting liquid oil in a little

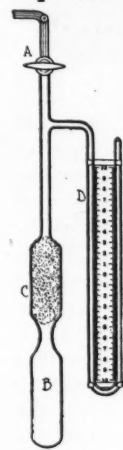
pool, which not only burns up on the piston itself, but at the reversal of the piston travel at the top, it is flung off on to the cylinder head, the tendency being to form a heavy patch of deposit right in the center of the cylinder head.

The Motorists' Bookman

Gasoline Vapor and Air.

UNDER the file number of technical paper 115 Petroleum Technology 26, the department of the interior bureau of mines has issued a booklet entitled "Inflammability of Mixtures of Gasoline Vapor and Air." This paper has been prepared by G. A. Burrell and H. T. Boyd and presents some valuable data on safety and efficiency in the use of fuels dealing specifically with the inflammable limits of mixtures of gasoline vapor and air and also the method of determining the content of gasoline vapor in such mixtures. These matters are of particular importance in the internal combustion engine and also in ascertaining the risks involved in the storage and use of the volatile hydrocarbon.

Fig. 1—Apparatus for determining gaseous mixtures



The detailed methods of carrying out the experiments can be obtained by applying to the Bureau of Mines, Washington, D. C., for a copy of the bulletin. The general results arrived at are, first, a definite method of determining the gasoline vapor in gaseous mixtures, and secondly, the limits of inflammability.

The method of determining gasoline vapor in gaseous mixtures is as follows: An apparatus similar to that shown in Fig. 1 is employed. The bulb A contains phosphorous pentoxide for removing water vapor. If the latter were not removed it also would be retained at low temperatures and would subsequently exert pressure when measurement was being made of the pressure exerted by the gasoline vapor.

To start a determination the apparatus is connected to a vacuum pump and its air exhausted. The mixture of gasoline vapor and air then is introduced at atmospheric pressure, the barometer is read, and the two bulbs are immersed in liquid air contained in a Dewar flask. After about 10 minutes the air is removed from the apparatus with a vacuum pump. The stopcock on the apparatus then is closed, the liquid air removed, the gasoline allowed to vaporize, and its pressure read on the mercury manometer attached to

the apparatus. The ratio of this pressure to the pressure of the atmosphere gives the percentage of gasoline vapor originally in the air.

The tests for the range of explosion were made in a Hempel explosion pipette. Combustion was deemed complete when upon ignition of the mixture flame filled the vessel as far as could be judged by eye. Measuring the percentage of gasoline vapor in the mixture it was found that no visible results were obtained until somewhere between 1.9 and 2 percent gasoline vapor. At 1.9 percent there was no visible result, at 2 percent there was complete inflammation. Experiments showed that complete inflammation resulted up to as high as 6 percent, after which only incomplete inflammation resulted.

Another set of experiments brought the figure at the lower limit down to 1.5 percent gasoline vapor. This was for gasoline of 73 degrees Beaumé. A new set of experiments was made to determine if the low limit for 73 degrees gasoline was different from that of what is known as cleaners' naphtha, which has a Beaumé rating of 59 or 60. It was found that complete inflammation started between 1.4 and 1.5 percent gasoline vapor. Roughly, it may be stated, therefore, that a mixture is explosive between the ranges of 1.4 and 6.4 percent gasoline vapor, as far as complete combustion is concerned.

Spell of Southern Shores

Comes the Spell of Southern Shores from the pen of Caroline Atwater Mason, and the press of the Page Company, Boston, a volume of the Spell Series, that takes the reader into sunny Italy. Who has not either visited Italy, or wanted to do so? This work of Caroline Atwater Mason, which sells at \$2.50 a volume, net, gives the reader transportation through the boot country from the Ligurian Riviera to Ionia and Sicilian seas, thence to the Adriatic, with many interesting side trips and explorations. The Spell of Italy offers fact harmoniously blended with fiction; that part that relates to historic persons, or persons now in the public eye, being fact, while that which concerns persons non-historic is a composite of fact and fiction.

Where the lines meet and mingle in the sketching of these last can matter little to the reader, suffice to say that from cover to cover, one gets the impression that he is seeing Italy instead of reading about it.

Six-Passenger, Two-Wheeled Gyrocar

Gyroscope Affords Control for Keeping Car Upright—Used in London



The gyrocar, which has but two wheels and carries six passengers

ON this page is shown the latest application of the gyroscope to the motor car. The engine used is a Wolseley standard 16-20 horsepower, four-cylinder, having a bore of $3\frac{1}{8}$ inches and a stroke of $4\frac{3}{4}$ inches. The normal engine speed is 1,200 r. p. m., at which 25 brake horsepower is developed.

It is of interest to note that the power for propelling the vehicle is transmitted from the engine through a Wolseley multiple disk clutch to a gear box, having four speeds forward and one reverse. As the rear wheel, which is worm driven, lies on the center line of the car, the universal propeller-shaft is thrown out of center so as to lie along the side of the wheel. For this reason the drive from the back end of the gear box is first transmitted to a countershaft to which the propeller shaft is attached, by means of a silent chain.

The gear box ratios of the various forward speeds are: First, speed direct; second, speed .74 to 1; and third, speed .497 to 1 and fourth, speed .25 to 1. With the worm and wheel supplied at present these ratios give speeds of 34, 25.2, 16.9 and 8.5 miles per hour respectively at normal engine speed.

Gyrostad Electrically Driven

It may be stated that the gyrostad, which is electrically-driven, is a mild steel forging, 40 inches outside diameter, having a rim weighing 500 pounds and rotating normally at 1,550 r. p. m. in a horizontal plane. The driving motor is fixed rigidly to the gyrostad frame, the armature being built on to the vertical spindle, beneath the gyrostad. This spindle runs in three roller bearings; ball thrust bearings of large size take the weight. It is said that all these bearings are lubricated by means of a small plunger pump which forms, together with the oil tank, from which it obtains its supply of oil, a complete unit and is self-contained with the gyrostad and its driving mechanism. The whole of the gyrostad and motor is sup-

ported by a frame, which is swung in trunnions fixed to the side members of the main frame of the vehicle. These consist of roller bearings.

The motor which drives the gyrostad derives its energy from a dynamo which is chain-driven from the primary shaft of the gear box. The drive for this dynamo is through a flexible leather coupling, which allows for any slight distortion that may occur under the various stresses to which the frame is subjected while the car is running. The normal speed of this dynamo is 2,000 r. p. m., but it may be run as fast as 3,500 r. p. m. for 15 minutes without overheating.

Gyro's Speed Variation

After about 2,000 dynamo revolutions the gyrostad's normal speed is maintained and if the revolutions of the dynamo exceed 3,000, which accelerates the gyrostad to its maximum speed of 1,550 r. p. m., an automatic switch comes into action which reduces the dynamo output sufficiently to uphold the speed and not accelerate further.

In order to control the gyro, two pendulums are used, one on each side of the car. These pendulums weigh approximately 110 pounds each and are free to swing in any direction, although it is only the outward swing that is utilized for controlling the vehicle. Each pendulum is connected by means of a chain and various levers to an arm, on the opposite side of the car; this arm being pulled down when the pendulum moves outwards. The arm carries at its other end a quadrant having fixed to it, at the top, a toothed rack.

As the fulcrum of the air lies between the two, any outward swing of the pendulum causes the toothed quadrant on the opposite side of the car to be lifted. Across the top of the gyro frame runs a shaft, which is worm driven from the top of the gyrostad spindle. The ratio between the speed of the gyrostad spindle and that of the cross shaft is 66 to 1. To the cross

shaft is fitted a striker, which at every revolution rings a bell. By timing these rings, and by means of a very simple calculation the speed of the gyrostad can be readily obtained.

It is said that the cross shaft, through suitable gears, drives two gear wheels, one on one side of the car in one direction, and one on the other side in the reverse direction. These gear wheels partially engage with the previously mentioned racks, when the latter are lifted. When a rack is lifted due to a pendulum moving outward, the corresponding gear wheel comes into contact with its rack and tends to wind itself along the face of the latter. The gyrostad is in this manner tilted either forward or backward, depending upon which rack comes into action, and due to the well-known effect that by hurrying up the procession a force is immediately set up in a direction to restore the equilibrium of the vehicle.

Use of Automatic Sprag

It is clear that as sudden contact between the racks and the gears would otherwise occur with considerable shock, the racks are held in position by means of spring rods. In order to give additional safety to the vehicle, automatic sprags are fitted which drop into action, when through the gyrostad losing its velocity, or from any outward cause, it has insufficient power and consequently swings too far, either forward or backward. These sprags are fitted with rubber-tired rollers; they are of sufficient strength also to allow the car to be driven with them down and the gyrostad at rest.

This is an advantage when the car is required to be moved a short distance, as in a garage, and it is hardly worth the time to speed up the gyrostad, which takes, owing to the comparatively small power of the dynamo and electric motor for driving the gyrostad, about 8 to 10 minutes. A small governor is fitted to the top of the vertical gyrostad spindle which, when the speed drops to 1,150 r. p. m. makes electric contact, and rings an alarm bell, thus giving the operator due warning that the gyrostad is losing its velocity, and requires speeding up.

The car is fitted with Dunlop solid tires, on Rudge-Whitworth detachable wire wheels. The spring suspension of the vehicle is accomplished by means of cantilever springs to both front and rear wheels. The front wheel is carried on a modified type of motorcycle steering head, and so arranged that the axle of the steering head is vertical at all times when the car is loaded and in motion.

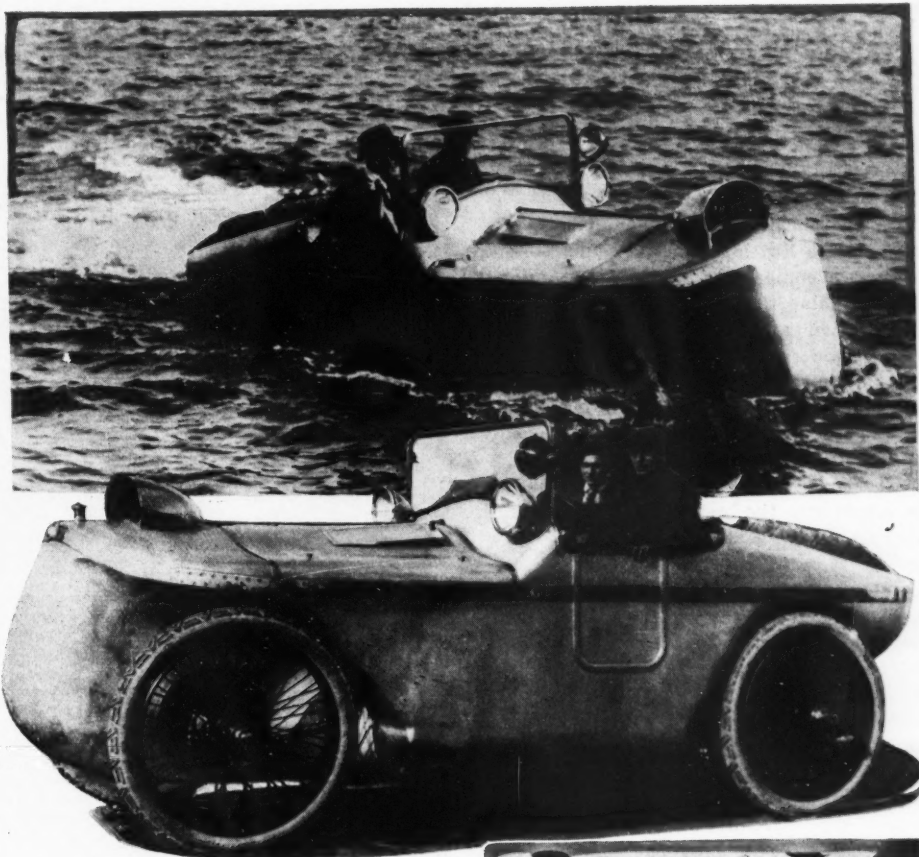
The steering is of the worm and sector type, the worm and sector having a ratio of 8 to 1, and the diameter of the steering wheel is 16 inches. The radiator for cooling the circulating water of the engine is of the gilled tube type placed against the dash board. The fuel tank is under the rear seat, and the fuel is fed by pressure to the carburetor of the engine by means

of a small air pump driven from the engine camshaft.

On this car the body is of the six-seated touring type, upholstered in blue leather, and fitted with a Wolseley patent hood. The side panels are arranged to open to allow of inspection of the gyrostat and its controlling mechanism. The engine is started by hand and run at about 500 r. p. m., at which speed the dynamo generates about 90 volts. The electric motor starter fitted to the dash is operated slowly, thus beginning to accelerate the gyrostat. Five brake horsepower is absorbed in acceleration, and after about 5 minutes running the speed of the gyrostat will be 1,000 r. p. m., when the vehicle will balance. To balance, the vehicle is first leaned to an inclination of about 5 degrees, and hand balls at each side of the driver's seat liberated. The rack is then automatically thrown into contact and the vehicle lifts on to an even keel.

In the latest construction of this gyrocar, the gasoline motor of the car also operates the gyroscope, whose weight is only one-tenth of that of the vehicle. The energy consumed by the gyroscope is $1\frac{1}{4}$ horsepower. The disk turns at the rate of 1,200 revolutions a minute and the gyroscope takes up little room and requires no manual control.

It is said that this bicycle car has run in the environs of London over good and bad roads alike, carrying six passengers, including the inventor and his chauffeur.



Top—Hydromotor traveling at 10 m. p. h. through water in Exposition grounds. Middle—View showing it converted for road work. Bottom—Rear, showing rudder and propeller

Sea-Going Motor Car Built in West Factory Will Be Operated in Los Angeles to Make Combination Craft

LOS ANGELES, Cal., Dec. 11—A factory is to be built in this city for the manufacture of Hydromotors or sea-going motor cars. The company is now applying for articles of incorporation under the laws of California.

The experiments with the Hydromotor at the Panama-Pacific exposition were successful enough to prove that a land and water car is a practical possibility. During the closing week of the exposition, six voyages were made on San Francisco bay and once the motor launch ventured out of the yacht harbor and saluted with a Klaxon, the battleship Oregon as she lay at anchor off Alcatraz Island.

A. Miani, president of the company which put out the first model, announces that the factory will be located in southern California. G. Lopizich, president of the International Bank of Los Angeles, is to head the new company, which will manufacture these land and water cars.

More than a year ago, the Board of Trade, of Lankershim, Cal., offered the company a manufacturing site. A site now has been offered at Wilmington, on the Los Angeles harbor, and it is probable that

the site will be accepted, as at Wilmington, the location will provide for the testing of machines on both land and water.

The car, which was used for the experimental work in San Francisco, is to be shipped to Los Angeles within a few days and tests and demonstrations are to be staged at the various southern California beach resorts.

The machine shown at the exposition weighs 3,000 pounds. The body is of aluminum. All the joints are made water tight. To insure this condition, two 1-inch brass bands are riveted to the edges. The length of the car is $16\frac{1}{2}$ feet. In the water the machine is propelled by a 16-inch screw propeller. The wire wheels measure 42 inches in diameter.

On the land, the car rides on its springs but in the water a patented bronze sliding device locks the water out of the axle housing.

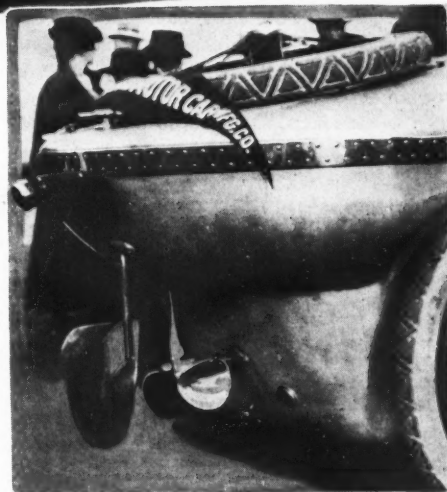
The first machine is propelled by a 6-35 Haynes engine hung on a special chassis.

A ventilator at the prow and a small opening on the forward deck, allows enough air circulation to keep the engine cool. Gear levers at the right of the steering

post allow the driver to shift the power from the wheels to the screw when the machine begins to float. Both the wheels at the propeller may be operated at the same time.

A sleeve engages a pin on the steering post which provides for change of steering control, automatically locking the front wheels and engaging the rudder. A reverse of the operation releases the wheels and disengages the rudder.

According to the present plans of the corporation's backers, four models are to be offered. A two-passenger roadster, a seven-passenger touring car, a light delivery truck and seven-passenger limousine. The same chassis is to be used for each type of body. The limousine is to sell for \$3,000 and the roadster at \$2,000, with the touring car and truck coming between these figures.



New Mercer Line Shows Some Change from Previous Design

Company Continues Adherence to Fours and Offers Some Unique Body Types for 1916

A NEW series of cars, known as the 22-72 models, has been announced by the Mercer Automobile Co., Trenton, N. J. They are equipped with four-cylinder motors, it being the established policy of the Mercer company to specialize in motors of four-cylinders only. The new models adhere closely to previous design, although several refinements have been made, but none are radical, either in chassis or body construction.

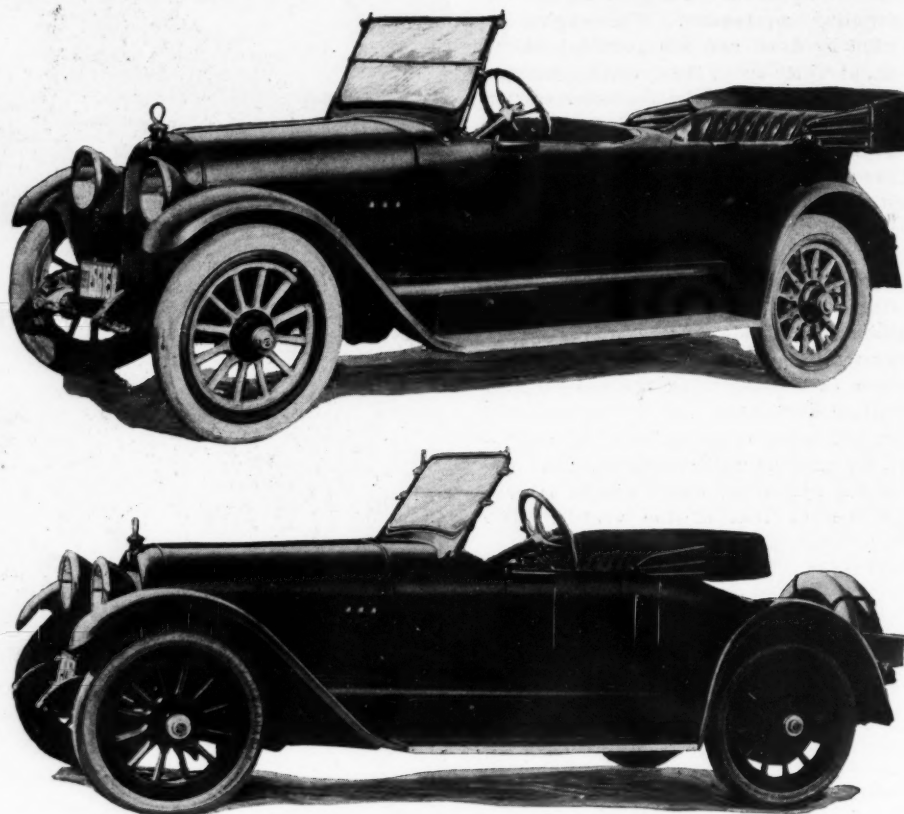
The chassis used for the various models is essentially the same, the principal difference being in the length. The motor is of the L-head type, block-cast, the bore being $3\frac{3}{4}$ inches and the stroke, $6\frac{1}{4}$ inches. The piston displacement is 298.2 cubic inches and the N. A. C. C. rating is 22 horsepower. In block tests, however, it has developed 72 horsepower at comparatively low engine speed, according to the Mercer testing department.

Power Plant Light Weight

In making the motor the designers have made special effort to produce a power plant of light weight, consequently the reciprocating parts are as light as is consistent with proper construction. An example of the lightening process is afforded in the connecting rods. The complete rod, with four bolts, weigh 3 pounds, 5 ounces. Aluminum pistons are used, the weight of each being 14 ounces.

The motor presents an especially clean and accessible appearance, both sides being free and clear. This is accomplished by running the pump and magneto from a cross-shaft in front. The only attachment on the side of the motor is a special Zenith carburetor and this is fitted directly to the cylinder, the intake manifold being cast integral with the cylinder block. The crankcase is of aluminum with a web extending all the way out to the frame, forming a platform on either side. This does away with the necessity of an oil pan and lends a very clean appearance to the motor as a whole. The valves are inclosed by means of a close-fitting aluminum cover, which is held in place by two thumb screws.

The crankshaft and camshaft are of nickel-steel. The diameter of the crank-



Two views of the Mercer 22-72 series. The top shows the six-passenger body and the bottom illustrates the runabout

shaft is $2\frac{1}{8}$ inches and the main crankshaft bearings are of generous size. The front and rear bearings are $3\frac{1}{2}$ inches long, while the centerbearing is $3\frac{1}{4}$ inches long. They are the plain type, being made of bronze, lined with babbitt alloy. The camshaft is supported by four plain type bearings, those at the front and rear being of bronze, while the two center bearings are die-cast babbitt. The camshaft is driven by a Renold chain. A small idler gear, with a spring attachment, is provided to take up any slack that may develop in the chain.

Lubrication is by means of a plunger pump driven from the center of the camshaft. Oil is forced under high pressure to the camshaft housing and to the main

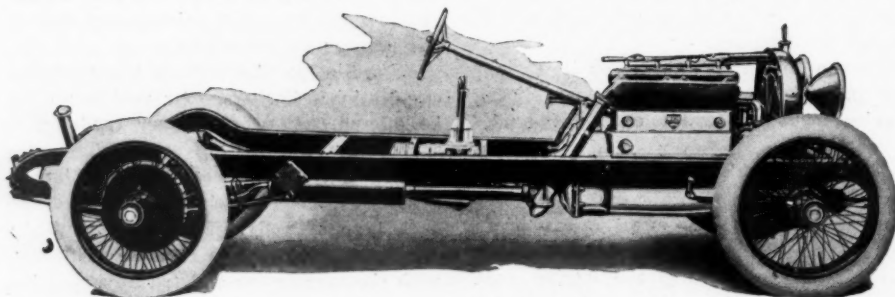
and connecting rod bearings. From the camshaft housing oil is carried to lubricate the timing gears. The connecting rod bearings are lubricated through holes drilled through the crank throws from the main bearings to the crank pins. Pistons are lubricated from the splash from the connecting rod bearings.

Clutch Dry Plate Disk

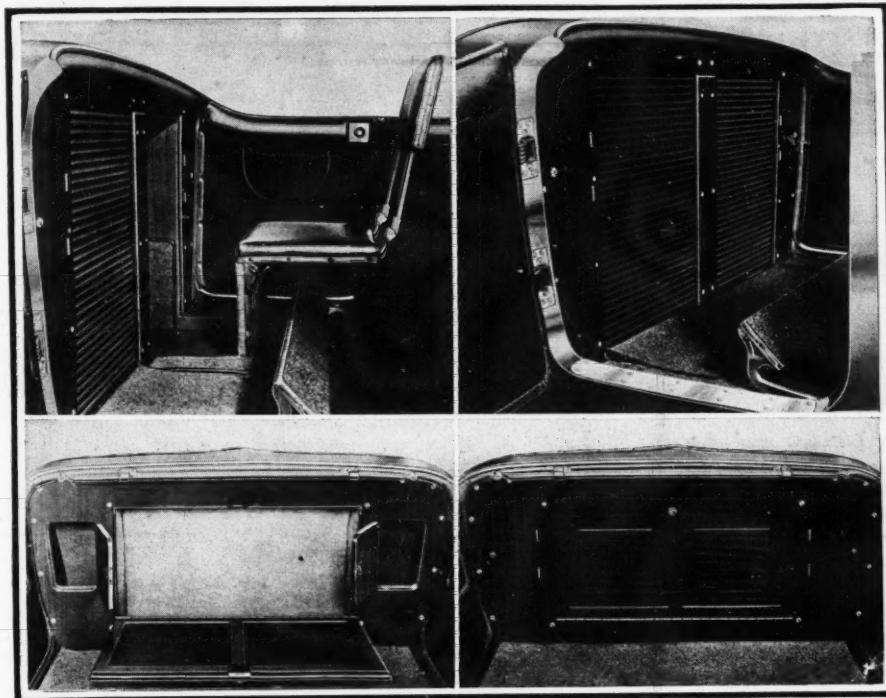
A dry plate disk type of clutch is employed on all models. Steel against asbestos fabric plates are used, providing a clutch that can be operated easily. A selective type of gearset is used, four speeds forward and one reverse. The gears and shafts are of chrome nickel steel.

The frame is arched over the rear axle. It also is narrowed in front to give a shorter turning radius. The touring and sporting models have the frame of 5-inch depth, while the runabout and raceabout types have frames of $4\frac{1}{2}$ -inch depth. Tubular cross-members are provided both in the front and rear to give the frame rigidity.

Springs are of generous dimensions as is also true of the brakes and axles. Semi-elliptic springs are found in all models both front and rear. The rear springs are underslung and are directly underneath the side rail. The nearly flat construc-



Chassis view of the Mercer 22-72



Auxiliary seating arrangement found in the Mercer. Note the roll doors that cover the disappearing seats when they are not in use

tion and method of mounting does away with twist or side slap when driving over rough roads. The rear springs are 59 inches long on the touring and sporting models and have a width of $2\frac{3}{4}$ inches. All spring bolts are fitted with automatic lubricating devices. Graphite inserts are placed between the leaves of the springs, thus giving additional lubrication. Brake drums are 16 inches in diameter and adjustments are made underneath the front floor boards.

Elliott Front Axle

The front axle is of the inverted Elliott type, with spring seats forged integral. The steering spindles and arms are made of heat-treated chrome nickel-steel. The rear axle is of the shaft-driven, floating type, the differential housing being drop forged. The axle shafts are heat-treated nickel with integral jaw clutches. Driving gears are of the spiral bevel type and all driving strains are imparted to the chassis through the rear springs.

The electric cranking and lighting equipment is a 12-volt U. S. L. system. The apparatus consists of a special motor generator or dynamo, installed in place of the flywheel and a 100 ampere hour battery.

As to body design, four different styles are offered—a six-passenger, four-passenger, runabout and raceabout. The six-passenger model is a very roomy car, particularly adapted to family use, while the four-passenger sporting model is all that the name implies, appealing to those who want a light car with plenty of snap. Both of these models have a chassis of 132-inch wheelbase. The runabout and raceabout types are built on a 115-inch wheelbase. the raceabout is a speed car and has a

guaranteed speed of 1 mile in 48 seconds.

The body details have been worked out with great care. The center cowl, which was introduced by Mercer last year, still is followed out in the 1916 models, but the interior of the bodies have been greatly improved. The auxiliary seat compartment of the six-passenger is finished in black walnut paneling. Doors that roll out of sight, like a roll-top desk, hide the extra seats from view when not in use. A complete set of tools may be carried in a special compartment built into the right front door.

Under the center cowl of the sporting model are separate compartments also covered with black walnut paneling. The middle compartment is sufficiently large to carry a good-sized suit case.

GASOLINE HIGH IN BAY STATE

Boston, Mass., Dec. 15—Massachusetts motorists are beginning to wonder what is to be the outcome of the higher prices asked for gasoline. Within the past 6 months there has been a 36 per cent increase in its cost here, and since January last it has jumped more than 60 per cent.

The new price announced today is 21 cents a gallon wholesale, and the Standard Oil Co., the Gulf Refining Co. and the Texas Co. are united on the price. This will mean 25 to 26 cents a gallon to the motorists. In January gasoline was selling here for 13 cents a gallon wholesale.

NILES TO BUILD MOTOR TRUCKS

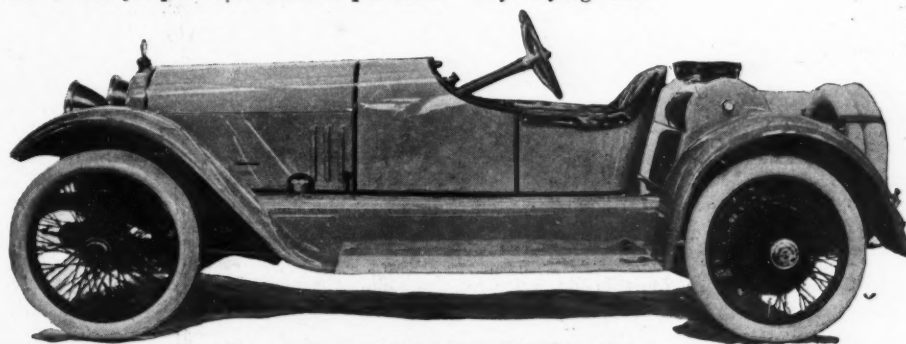
Niles, O., Dec. 15—The Niles Car and Mfg. Co., which has been confining its attention to the manufacture of interurban cars, will soon turn out motor trucks for general delivery purposes, according to an announcement made recently. The matter had been under advisement for some time by the directors of the company and because of the fact that an amendment must be made in the charter of the corporation, a stockholders' meeting has been called.

MOLINE PLOW BUYS CULTIPLow

Columbus, Ohio., December 15—The Moline Plow Co., has purchased the manufacturing rights for the Universal Cultiplow, heretofore produced by the Universal Tractor Mfg. Co. though it has not taken over this company. The Universal Co. will discontinue. F. B. Funk is engineer and factory manager of the tractor department of the Moline Plow Co., and S. C. Turkenkoph will be assistant to the sales-manager of all departments and the company's tractor expert. The Moline Co. will build tractors on a much larger scale than possible by the Universal Tractor Mfg. Co.

EXPLAINS GAS PRICE RAISE

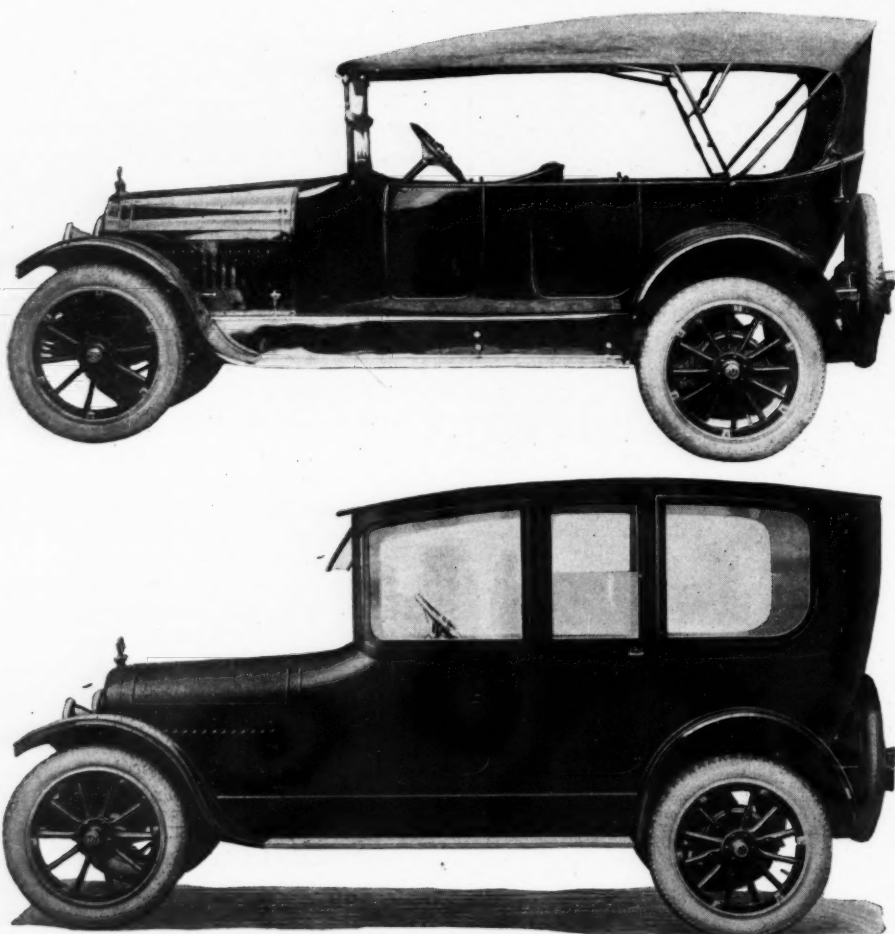
Detroit, Mich., Dec. 11—Dr. Walter F. Rittman, of the United States bureau of mines, spoke tonight at the Board of Commerce, on the subject of gasoline and explained his new patented process which permits the output of gasoline to be tripled, as compared with the former or old methods of contracting and obtaining the fuel from crude oil. Some of the reasons given by Mr. Rittman for the shortage of gasoline are the tremendous increase in sales of cars in this country, the increased export business in oil which now averages 250,000,000 gallons a year and the fact that the Cushing oil fields in Oklahoma, which a year ago produced 300,000 barrels of oil a day, are gradually drying out.



Illustrating the Mercer 22-72 raceabout

Wescott Adds Another Six and a New Sedan

Several Body Types Are Offered in Both Models—Continental Motor
With $3\frac{1}{2}$ by $5\frac{1}{4}$ Cylinder Used



The upper view shows the model 42 touring car and the lower is of the model 51 with sedan body

SINCE the announcement of the Westcott model 51 in *Motor Age* early in the fall, the Westcott Motor Car Co., Richmond, Ind., has been testing out a new model which will be shown at the New York and Chicago shows. The new car which will be known as the model 42 will be put out as a five-passenger touring car, a three-passenger roadster, and a three-passenger cabriolet, while the previous model 51, which as was announced in August, has a seven-passenger touring car, will also be put out as a sedan, and a three-passenger roadster body will be fitted to the model 51 also.

Differ Only in Size

The 51 and 42 models differ only in weight, length of wheelbase, auxiliary seats, and tire equipment. The wheelbase of the 51 is 126 inches, while that of the 42 is 121 inches. The motor is the same in both models, the standard six-cylinder Continental engine with a $3\frac{1}{2}$ -inch bore and a $5\frac{1}{4}$ -inch stroke being used. The flexibility and power of this engine as demonstrated in the model 51 was a factor in determining to use it in the new model 42. A Rayfield carbureter is used

and bolted direct to the cylinder block without the customary intake manifold and the fuel is taken from a Stewart-Warner gravity system feed.

Considerable time has been spent by the Westcott company in designing its sedan and cabriolet bodies and much has been done toward giving greater convenience and luxury than is possible in a car of the open type. The sedan consists of a detachable top fitting to the standard touring car body and thus converting the open car into closed winter model. The connection to the body of the car is so designed that there is no overhang at any point and when fitted to the touring car body it conforms to the usual closed-car practice both in appearance and efficiency.

The Westcott touring windshield is removable by the loosening of two nuts and the detaching process is a matter of only a few minutes. By removing this windshield space is provided for anchoring the sedan top. All points of anchoring are invisible and in no way mar the appearance of the touring car body after the sedan top has been removed. This top is trimmed in accordance with the usual limousine

practice, good grades of cloth and lace being used together with dome lights, silk curtains, locking handles and other features.

The roadster, as well as the cabriolet models, has the cloverleaf seating arrangement. Another convenience besides that of the cloverleaf arrangement which gives the driver a greater freedom of movement is the control adjustment. A 6-inch adjustment is provided on both control pedals, and the steering column can be raised or lowered to suit the convenience of the driver. This has several advantages over the sliding-seat arrangement that has been brought out in an effort to solve the problem arising from the fact that all car drivers are not physical counterparts.

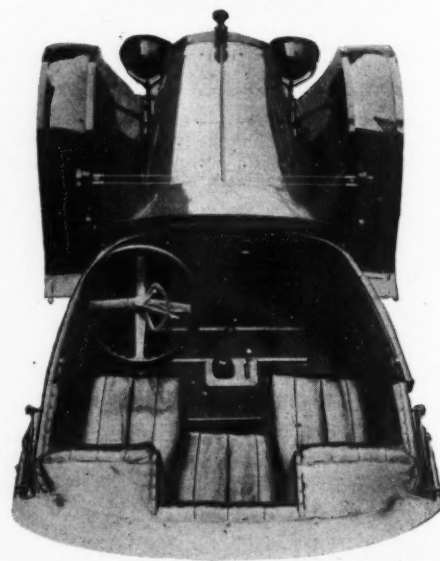
With a view to obtaining lightness without sacrificing strength, the entire base of the motor used in the Westcott cars is made of aluminum, only the cylinders and pistons being of cast iron. Another interesting motor feature is that all the pistons can be removed by displacing the base of the motor and turning the crankshaft into position. To do this, it is not necessary to move or disturb the crankshaft. The lubrication is by force feed to all main bearings and to other bearings by the standard splash system.

Minor Changes

The carbureter mixture control has been changed from the steering column to the cowl, which gives it greater rigidity and therefore lessens the probability of its being shaken out of place. The battery box is in a holder on top of the frame and under the driver's seat, being accessible by removing the cushion of the seat.

The clutch construction of the Westcott

(Concluded on page 41)



View showing seating arrangement of three-passenger roadster

1916 Winton Six in Two Sizes—Prices \$2,285 and \$3,500

Model 48 has a $4\frac{1}{2}$ by $5\frac{1}{2}$ Motor and the Model 33 Cylinders Measure $3\frac{3}{4}$ by $5\frac{1}{4}$ Inches

TWO new Winton sixes will make their bow at the New York show and again will be seen at the Chicago show, making up the Winton line for 1916. These two models have been designated as the 33 and 48 at \$2,285 and \$3,500 respectively. The model 48 embodies a six-cylinder motor having a bore of $4\frac{1}{2}$ inches and a stroke of $5\frac{1}{2}$ inches, giving an N. A. C. C. rating of 48.6. The model 33 motor, also a six, has a bore of $3\frac{3}{4}$ inches and a stroke of $5\frac{1}{4}$ inches and an N. A. C. C. rating of 33.75. Both have low suspension and all moving parts are fully inclosed.

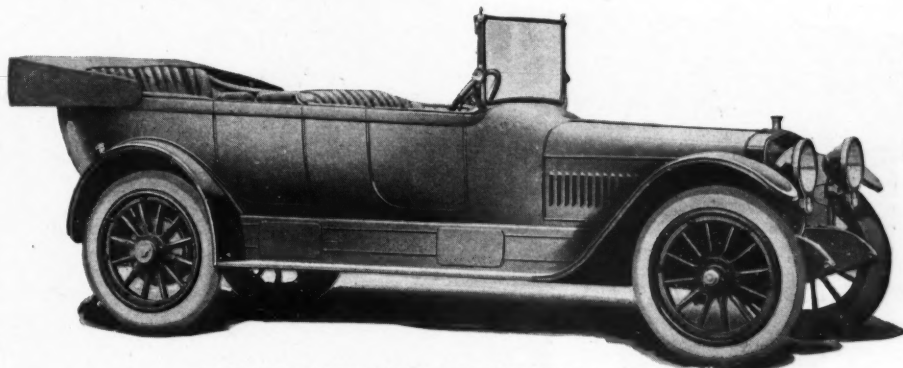
The cylinders are cast in pairs and a special design of piston ring is used. The piston pins are of hardened tool steel and the connecting rods are extra long to reduce angularity of operation. The valves are of liberal size all on one side of the motor and are interchangeable. The valve springs, plungers and valve plugs are covered by steel plates which are readily detachable. The camshaft and cams are one-piece forging, the profile of the cams being such as give a flow of gas proportional to piston speed. The camshaft is removable through the front of the case without removing the valves, springs, push rods or rollers.

Chain Timing Drive

In the model 48 as well as the 33 the camshaft and magneto are driven by a silent chain. The crankshaft is of specially treated steel with all bearing surfaces ground and is carried in four bearings bushed with Parsons' white brass. The crankcase is of aluminum being divided into upper and lower halves with all bearings in the upper half.

A two-unit Bijur electric starting and lighting system is used in both models. Ignition is furnished by a Bosch magneto and the carburetor is a specially designed Rayfield, water-jacketed, with hot-air supply and dash control. Force-feed lubrication is offered by a pump driven by spiral gears which takes oil through a screen from the lower crankcase and delivers it through a tube case within the crankcase to the main crankshaft and camshaft bearings, and through conduits drilled in the crankshaft to the connecting rod bearings, and also through a tube to the front chain.

Cooling is centrifugal pump in connection with a honeycomb radiator and fan. The clutch is a dry plate with seventeen disks, nine of which are attached to the transmission shaft and eight to the drum bolted to the flywheel. The gearset which runs in oil offers four speeds forward and one reverse with direct drive on third speed through internal and external gear combinations. The Elliott type front axle is used and the rear axle is of the floating



WINTON FORTY-EIGHT, WHICH SELLS FOR \$3,500

Other body styles are furnished when desired. The motor is a six-cylinder, cast in pairs, and develops 48.6 horsepower, according to N. A. C. C. formula

type. Incorporated within the rear axle are spiral-bevel driving gears, bevel differential running in oil nickle-steel gears and pinions, and Timken roller bearings throughout.

Two types of brakes are offered in each model, internal expanding and external contracting. The frame is narrowed at the front end to allow a shorter turning radius and there is no sub-frame. Rear springs are three-quarter elliptic, made of chrome vanadium steel. They are under-slung and act as radius rods having no forward end shackle and are suspended outside and frame rails. Spring eyes are bronze bushed with spiral grooves and have rebound straps. All springs are equipped with Dann lubricating cushion inserts.

Body Types

The cowl board carries electric lighting switch and ammeter, carburetor control, speedometer, clock and ignition switch. The model 48 is a seven-passenger while the model 33 is a five. Both bodies are finished with concealed hinges and offer plenty of leg room. The front floor is aluminum covered and divided seats in the five-passenger car are optional, while the tonneau of the seven-passenger is electric-lighted. The Winton company makes its own body and its line includes four- and six-passenger touring, roadster, coupe, sedan, landaulet, and limousine types. Color options are offered, the Winton company aiming to let each buyer express his personal taste as to finish. Tires on the model 48 are 37 by 5, and on the 33, 36 by $4\frac{1}{2}$. The wheelbases being 138 inches and 128 inches respectively for these two models.

Equipment consists of ventilating rain-vision windshield, electric head and tail lights, one-man top of mohair or rubber at the buyer's option, Jiffy curtains, Spartan horn, Warner speedometer, Waltham clock, mechanically driven tire pump, and an extra demountable rim. At \$3,500 the model 48 is offered in runabout or four,

five, six or seven-passenger bodies, while the model 33 at \$2,285 may be had as a runabout, four-passenger or five-passenger touring car; a six-passenger body at \$2,435 and a seven-passenger at \$2,355.

WAR ON ACCESSORY CLUBS

Chattanooga, Tenn., Dec. 15—The Chattanooga Automobile Club has entered the fight against fake "co-operative accessory buying" clubs, which have cost a number of the members large amounts, in addition to considerable annoyance. After having been persuaded by plausible accounts of how money could be saved by this scheme, many Chattanooga motorists have been unable to get anything at all in return or were compelled to buy inferior articles at higher prices than those at which local accessory stores sold better accessories. In several cases where the members notified the officials of the club that they had been solicited for such organizations, and an investigation was begun, the solicitor quickly disappeared from view.

SPEND \$13,140,000 ON CARS

Topeka, Kan., Dec. 15—C. W. Myers, head of the state motor car license department, has just compiled a set of figures showing that Kansas owners expend \$13,140,000 a year on the maintenance and upkeep of their cars. His figures are based on the license records showing ownership of 73,000 cars, exclusive of those in the hands of the dealers, within the state.

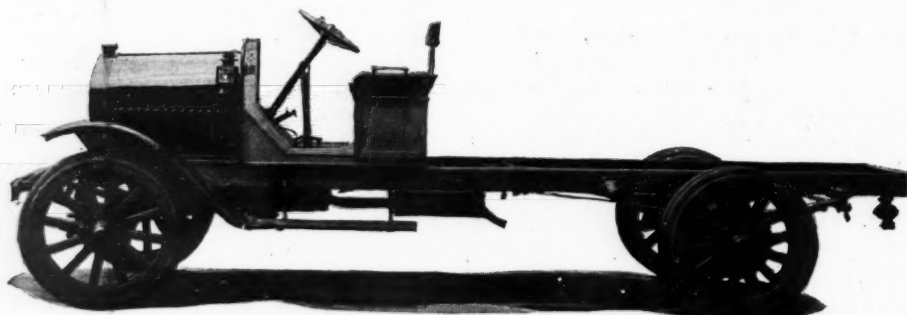
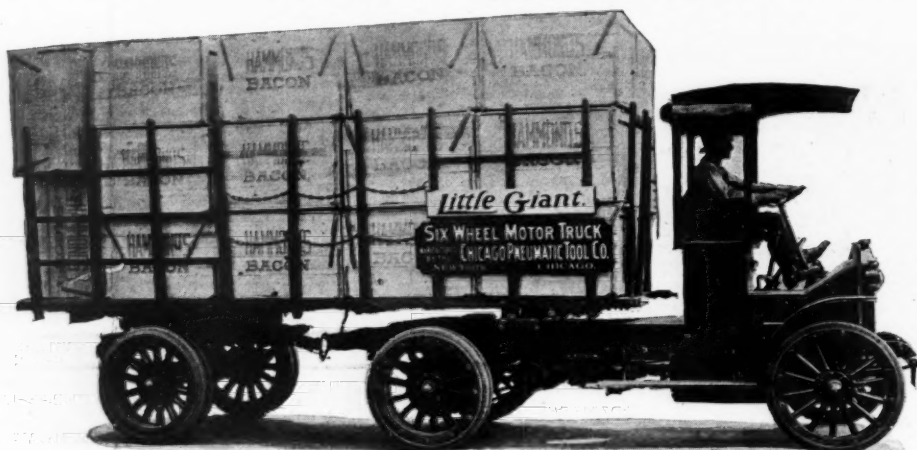
Myers has taken an average of \$15 a month as the upkeep cost and thus worked out his findings. It shows a cost of \$180 a year a car, divided equally between gasoline and oil, tires and accessories, and labor and repairing. The value of the Kansas owned cars is given at \$75,000,000.

"The motor not only has converted blacksmith shops into garages, but also has driven the old-fashioned livery stables out of business."

Three Little Giant Trucks in Line

Two Are Worm-Driven and One Chain-Driven

—Prices Range from \$1,350 to \$2,500



Upper view shows Little Giant truck with trailer, and the lower illustration is of the chassis of the worm-driven model

THREE models of the Little Giant truck are being marketed by the Chicago Pneumatic Tool Co., Chicago, a $\frac{3}{4}$ -ton, a 1 to $1\frac{1}{2}$ -ton, and a 2-ton. With any of these models a trailer device may be had, making a six-wheeled truck. The $\frac{3}{4}$ -ton size lists at \$1,500, the 1 to $1\frac{1}{2}$ -ton, \$1,350, and \$1,450 chassis only, and the 2-ton, \$2,500.

The $\frac{3}{4}$ -ton model uses a four-cylinder motor, with block-cast cylinders, measuring $3\frac{1}{2}$ by 5, the N. A. C. C. horsepower rating being 22. The front axle is a Timken, 2 by $2\frac{1}{2}$ inches and the rear axle is worm-driven, having a gear ratio of 6 to 1. A Schebler, type R, 1-inch carbureter is used and cooling is by thermosyphon in connection with a cellular radiator. The clutch is a dry-plate, multiple disk. An Eisemann magneto is used and the lubrication system is a combination of force feed and splash, the pump being driven by a gear that operates from the camshaft.

Double Braking System

The hand brake is internal expanding and the foot brake is external contracting. The chassis length over all is $179\frac{3}{4}$ inches, the loading space back of the driver's seat being $87\frac{3}{4}$ inches. The wheelbase is 120 inches and the width outside of fenders is $69\frac{1}{2}$ inches. The height of the

frame from the ground, when loaded, is 28 inches. The admissible load on chassis, including body, is 3,800 pounds, 90 per cent on the rear wheels. The speed at 1,100 r. p. m. is $18\frac{1}{2}$ miles per hour, this being automatically controlled by a governor.

Tire Sizes

Springs are semi-elliptic, 38 by 2 inches in front and 48 by $2\frac{1}{2}$ in the rear. Tires measure 34 by $4\frac{1}{2}$, pneumatic, in front and solid 34 by $3\frac{1}{2}$ inches, single, in the rear. The drive is direct on high and there are three speeds forward and one reverse is direct on high and there are three speeds forward and one reverse.

The tread is 56 inches in front as well as in the rear. The chassis equipment includes driver's seat and cushion, dash and foot boards, front mud guards, side and tail oil lamps, electric horn, tool box and tools.

The 1-ton chain-driven, uses a four-cylinder motor, block-cast, $3\frac{3}{4}$ by $4\frac{1}{2}$, while the $1\frac{1}{2}$ -ton size uses the same motor and is practically the same all through, except for additional strengthening of certain parts to accommodate a heavier loading, therefore a description of the $1\frac{1}{2}$ -ton model will suffice for both, except for those changes, which will be noted as the different parts are taken up.

The carbureter is a Holly of the standard, float-feed type. Cooling is by thermosyphon, the water inlet passing into the bottom and the return outlet placed over the exhaust valves. A low-tension Kingston magneto is used together with dry cells for starting. Drive is taken through a double universal to transmission and jack-shaft assembly, the full final drive being through the jack-shaft to side chain. The gearset offers three speeds forward and one reverse. A multiple disk clutch running in oil is used. There is a stuffing-box between the clutch case and the gearset, which enables the use of grease in the gearcase and light oil in the clutch.

The service brake is a double external contracting on the jackshaft, operated by a foot lever. The emergency, double internal expanding, operated by a hand lever. The frame is 4-inch channel section and the cross members are of the same material.

Makeup of Springs

Springs are semi-elliptic, 40 by $2\frac{1}{4}$ inches, with eight leaves in the 1-ton and ten leaves in $1\frac{1}{2}$ -ton. The rear springs measure 42 by $2\frac{1}{4}$ inches and ten leaves make up the 1-ton and twelve leave, the $1\frac{1}{2}$ -ton. The rear springs are assisted by an auxiliary spring, 28 inches by 2 inches, and having five leaves parallel to and working on the axle.

The front axle is $1\frac{1}{2}$ by 2 inches with a $1\frac{1}{4}$ -inch spindle, while the rear is 2 by 2 in the 1-ton and $1\frac{3}{4}$ by $2\frac{3}{4}$ on the $1\frac{1}{2}$ -ton. Tires on the 1-ton are 3-inch solid rubber with demountable rim in front and $3\frac{1}{2}$ -inch on the $1\frac{1}{2}$ -ton. Rear tires are $3\frac{1}{2}$ -inch solid on the 1-ton and 4 inches on the $1\frac{1}{2}$ -ton.

An option is offered in the body styles, the loading space in both models being 44 by 114 inches. The wheelbase is 110 inches and the tread 56 or 60 inches. The speed is given as from 4 to 20 miles per hour, and the approximate weight as 3,000 to 3,800 pounds, according to the style of body.

The 2-ton, worm-drive model uses a Continental motor, $4\frac{1}{8}$ by $5\frac{1}{4}$ inches, rated at 27.2 horsepower. An Eisemann high-tension magneto is used in this model and a Schebler, type R, $1\frac{1}{4}$ -inch carbureter is used instead of a Holly as on the other models. The speed is 15 miles per hour at 1,100 r.p.m. Tires are 36 by 4 solid, single in front and 36 by $3\frac{1}{2}$ dual solid in rear. Two speeds forward and one reverse are offered in this model and the tread is 58 inches in front and $58\frac{1}{4}$ in the rear.

The six-wheel equipment is a separate unit and is furnished with the truck models or separately. In this construction only sufficient load is placed on the chassis of the truck to secure proper traction. The weight so imposed is not rigidly fastened to the chassis, but rests on a ball race, making it in all respects virtually a live or floating load.

WESCOTT HAS NEW SIX

(Concluded from page 38)

is of the multiple-disk type, twelve Raybestos-faced disks and thirteen steel-faced disks being used. The ball gearshift lever control is used and the control housing is fitted with a cap to protect the occupants of the car from any grease that might accumulate in the housing and ooze out to soil the clothing.

Upholstering is of long grain, bright enamel leather, hair-stuffed. The leather is plaited and installed without the use of bottoms which adds materially to the ease of cleaning as well as to the riding qualities.

The steering gears of the Westcott car are of the semi-reversible worm-and-wheel type, the wheel being of extra heavy solid walnut and aluminum. Drive is taken through a tubular shaft with two Spicer universals. The axles are standard Timken construction, the rear axle being held in alignment by means of a double-torque arm. Brakes are equalized by a cross-member equalizer and brake linings are of Raybestos, the brake adjustment being by thumb screws which can be operated by hand, thus doing away with the necessity for using wrenches as was found in former Westcott construction. The rear springs are cantilevers.

Equipment Complete

Firestone quick-detachable rims are used and the tire equipment is non-skid for all four wheels. The extra tire carrier is at the rear, the tire being held in position by the use of only one bolt. A second tonneau light has been added to the model 51, and Moto-Meters are made a part of the standard equipment of both the 51 and 42. All models are provided with a standard 8-day rim-wind and rim-set clock.

The auxiliary seats fold and disappear under the front seats, offering an unusually roomy five-passenger car. Plenty of leg room is given in both compartments of all the Westcott models. Another feature is the method of holding the Jiffy curtains.

The model 6-51 sedan is priced at \$1,945, while the touring car and roadster styles in the 51 are listed at \$1,595. The 42 touring car and roadster are priced at \$1,445 and the cabriolet at \$1,745. The cabriolet in the 41 which in the three and five-passenger models is listed at \$1,295 is \$1,595.

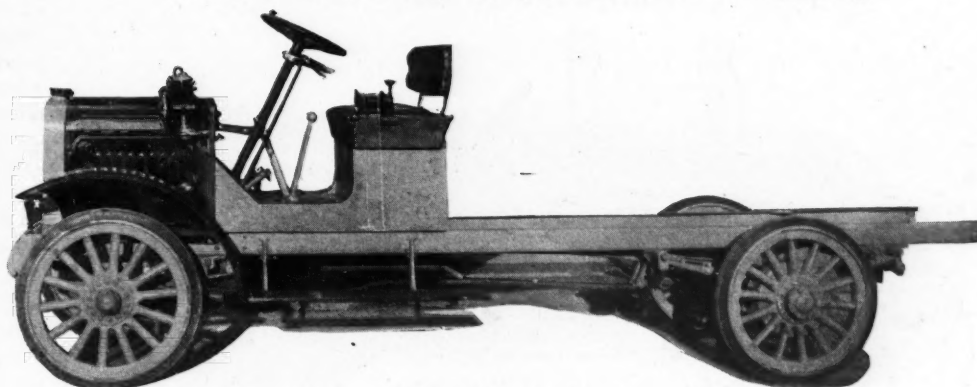
S. A. E. MEETS JANUARY 4-6

New York, Dec. 15—The program of the winter meeting of the Society of Automobile Engineers calls for a 3-day conclave at the Engineering Societies building, 29 West Thirty-ninth street, from January 4 to 6.

The Standards Committee will report on January 4 and the general meeting will be held on January 5 and 6.

Service Adds New 1-Ton Worm Drive

With Additional Model the Line Comprises Five Types of 1, 1½, 2, 3½ and 5-Ton Capacity



New service 1-ton worm-driven truck

THE Service Motor Truck Co., Wabash, Ind., has added a new, worm-driven one-ton truck known as the model 20 to its line for 1916. This truck uses a Buda motor, four-cylinder, 3½ by 5½, block cast. The cooling is by thermo-syphon and the motor is an L-head having valves on the right side.

Ignition is by Bosch magneto and the carburetor is a Stromberg with an automatic float feed and dash control with a hot air connection. The gearset is in unit with the motor and a dry plate clutch faced with Raybestos against steel is incorporated in the unit. Three speeds forward and one reverse are offered, the gears and shafts being of heat-treated alloy steel, and carried on Fafnir annular bearings.

Option of Timken or Sheldon Axle

The control is located in the center mounted on the top of the gearset and drive is from the left side. The steering gear is a Ross irreversible truck type with worm and nut and double ball thrust bearing. The springs which are of silico-manganese steel oil tempered measuring 40 by 2¼ in front and 50 by 2½ in the rear. All spring eyes are bronze brushed and rear springs are banded.

Either a Timken or Sheldon front axle may be had. Taper roller adjustable bearings are mounted in the hubs and all other wearing parts are bushed. The rear axle is a Timken-David Brown floating and has integral spring pads with Timken taper roller bearings throughout. The worm, worm gear and differential are mounted as a unit the housing being re-inforced with nickle steel tubes. An option is offered between the Timken-David Brown axle and the Sheldon worm drive with the David Brown type of worm mounted on annular bearings, the Sheldon axle being of the semi-floating type. In this the drive shafts are of alloy steel heat-treated and ground to size.

Double internal expanding brakes are

used in this model of Service truck, the service brake being operated by foot pedal and the hand brake by a lever at the driver's right. The brake drum is 16 inches in diameter and the brakes being located on the inside of the drum avoids interference from chains.

As to general arrangement, the motor, clutch transmission are mounted and assembled as a unit carried in the frame by 3-point suspension. The rear springs are on the outside of the frame and designed to be flat under load, thus giving easy riding and low loading space. Tires are solid, 34 by 3 in front and 34 by 4 in the rear. The chassis weight is 3,200 pounds and the price \$1,375.

Four other models make up the Service line consisting of 1½, 2, 3½ and 5-ton models, all being of the worm-driven type.

NEW MOON ANNOUNCED

St. Louis, Mo., Dec. 14—The Moon Motor Car Co., has just announced a new 1916 six-thirty at \$1,195, completely equipped.

In many respects the car resembles the six-forty, seven-passenger, selling at \$1,475. The wheelbase, however, is shorter, being 118 inches. The 3¼ by 4½ Continental-Moon unit power plant is block cast with cylinder heads removable. The tires are 33 by 4 and are demountable with one extra rim and carrier.

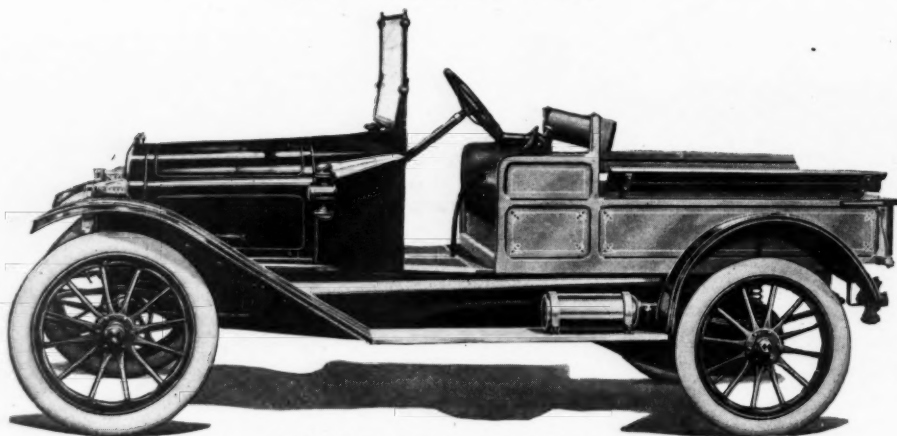
The new model has a tumble-home type body with convex side and embodying stream-line design. Other features of the body are deep cowl and instrument board; wide tonneau doors, 22 inches, with concealed hinges and concealed locks.

CHALLENGE MICHIGAN LICENSE LAW

Detroit, Mich., Dec. 15—As there has been a good deal of controversy about the new Michigan motor car tax law, which goes into effect January 1, it being claimed that the law is unconstitutional, a test case will be taken to the courts.

Metz Delivery Car Enters Field

Three Models Bought Out at Prices Ranging from \$475 to \$600



Metz delivery type body at \$475 and \$525

THE Metz Co., Waltham, Mass., heretofore producing only roadsters and touring cars, has placed on the market three special types of commercial delivery cars. The Model A is a 25-horsepower car with express body, equipped with Prest-O-Lite tank, two gas headlights, two side oil lights and one tail lamp. The measurements of the body are: 54 inches inside length, 41½ inches wide; sides 10 inches deep with 6-inch flare boards. This model sells for \$475.

The Model B is identical with the Model A with the exception that it is equipped with Gray & Davis electric starting and light system, and the price is \$50 more, or \$525.

Another type, known as the Model C, also is rated at 25 horsepower and is equipped with an express body, top and side curtains. The light equipment is the same as the Model A. Curtains are arranged to roll up in good weather and can be let down so as to inclose the body in bad weather. The measurements of the body are the same as the Model A except that the distance from the floor to the top in the center is 49 inches. This model sells for \$525.

Model E is the same as Model C, except that it is equipped with Gray & Davis electric starting and lighting and the price is \$575. The Model E is a commercial delivery car with an inclosed paneled body, equipment consisting of Gray & Davis electric starting and lighting system. The body measurements are: 54 inches long, 38 inches wide at the bottom, tapering to 42 inches, and the height from the floor to the center of the top is 49 inches. The door measures 26 by 39 inches. Price, \$600.

FINAL DECISION IN CASE SUIT

Racine, Wis., Dec. 15—The case of the J. I. Case Plow Co., Racine, against the J. I. Case Threshing Machine Co., Racine,

involving the right of the defendant to use all or any part of its corporate name as a brand or trade-mark on products also manufactured by the plaintiff, was decided by the supreme court of Wisconsin last week. The circuit court held that the Case T. M. Co. be perpetually enjoined and restrained from using the name "Case" or "J. I. Case" on any plows or tracting plows, whether animal or power-propelled, or the word "Case" in connection with any other words, such as "Case-Racine" or "Case-Sattley." The supreme court modified the injunction to the effect that the Case T. M. Co. could use its name on such products, provided that the follow-

ing be displayed conspicuously in connection therewith: "NOT the original Case Plow" or "NOT the Case Plow Made by the J. I. Case Plow Works." The Case T. M. Co., however, is given delivery of all mail matter, the address of which might cause confusion as to which company it should be given. The plow company is privileged to have a representative present when mail in dispute is opened. The case did not affect the use of the name "Case" on motor cars, which alone are manufactured by the Case T. M. Co. The fight has been waged since 1910. The decision on mail delivery is in accordance with the ruling of the postoffice general, made several years ago.

OWENS IN ANOTHER RUN

Philadelphia, Pa., Dec. 11—Six Owen Magnetic cars covered 200 miles in a demonstration run between New York and this city this week and now are on exhibition at the Carl H. Page Motors Co. headquarters. The new magnetic transmission, which recently received the indorsement and backing of the General Electric Co., completed the test with 100 per cent mechanical efficiency.

The run started from New York, crossing the Hudson River into New Jersey, and then to Newark where a halt was made at the new show room of the Carl H. Page Co. Leaving Newark the tourists proceeded to Hackensack, Rutherford, Belleville, Morristown, Hackettstown and Easton. At the latter place a banquet was held at the Huntington Hotel, at which J. B. Entz, the electrical engineer who invented the transmission, explained its details.

Rogers Brothers Brings Out Steel Trailer

Several Lengths Offered at Prices Ranging from \$75 to \$100

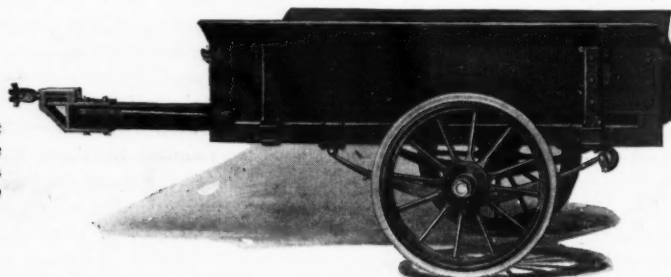
THE Rogers Bros.' Co., Albion, Pa., has designed a line of all-steel trailers and offers them to meet a variety of uses. The body length outside is 6, 8, 10 or 12 feet and the width, 4 feet, the height of the sides being 10 inches. Flare boards are provided, these being 6 inches wide. The drawbar extends 3 feet from the body and the height of the bed from the ground is 25 inches. The sides and the ends of the body are removable.

The drawbar is designed to absorb shock

and has a universal with a spring to relieve the trailer from strain in stopping and starting, or when the road is uneven.

The springs are of the motor truck type, semi-elliptic and underslung, oil tempered, 40 inches long and 1¾ inches wide, with seven leaves. The leaves are clipped and bolted to the axle with oscillating shackles to the frame.

The axle is 1¾ inches square, heat treated and the tread of the trailer is 56 inches. Heavy duty ball bearings are



The illustration at the right shows the Rogers trailer which comes in several body sizes

used. Tires are solid rubber, 28 by 2 inches, or an option is offered of pneumatic tires, 30 by 3, at an additional cost.

The connection bolts to the frame of the car or truck and a special connection is offered for Ford cars. The trailers come finished in black, although any color can be had, if desired. Its weight is about 500 pounds, crated. It is shipped knocked down. The trailer with 6-foot body lists at \$75; 8-foot, \$80; 10-foot, \$90 and 12-foot, \$100.

MEXICO BUYS MILITARY TRUCKS

Los Angeles, Cal., Dec. 15—The Moreland Distillate Motor Truck Co. of this city has discovered a new field for the commercial car. Four Moreland trucks have just been delivered to the recently recognized Mexican government.

As a special agent for the Carranza forces, operating under orders from Gen. Alvaro Obregon, Senor A. Gonzales, one of the wealthiest and most influential citizens of Mexico, came to Los Angeles to purchase four trucks for military service. Dealing direct with the factory officials the Senor had the four trucks, equipped with bodies, on the way to Mexico by express, accompanied by an expert driver and mechanical expert, in less than 24 hours.

In less than 48 hours after the order was given, the trucks were being unloaded at Nagales. The formalities of the customs service had been previously arranged and the trucks crossed the line and went into service without a hitch.

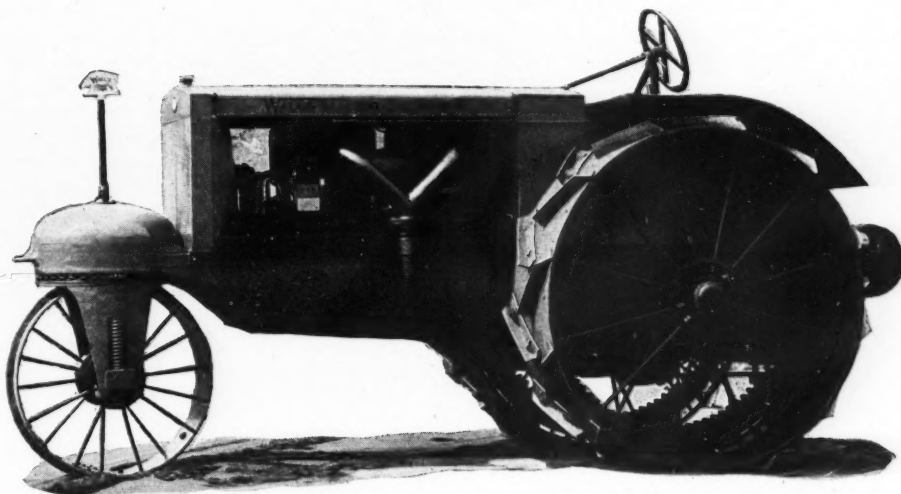
According to officials of the local factory, the first order is but a fraction of the business awaiting the truck manufacturer in Mexico under the newly established and recognized government which is expected to restore peace within a short period.

U. S. TIRE SUIT DISMISSED

New York, Dec. 14—The suit of the DeLaski & Thropp Circular Woven Tire Co. against the United States Tire Co. was dismissed by Judge Hand this week. This case was an effort on the part of the DeLaski and Thropp company to secure the upholding of its tire core patent, by means of new testimony, following a decision of the Circuit Court of Appeals holding the patent invalid because anticipated. The patent in question covers moulds used in the manufacture of tires by practically the entire industry and if upheld would give a practical monopoly to the owner which would permit the exaction of large sums.

The Wallis Cub Tractor Made at Racine

Uses a 6 by 7-Inch, 4-Cylinder Motor—Will Plow 10 to 15 Acres a Day



The Wallis cub tractor, which has a road speed of about 4 miles per hour

THE Wallis Fuel-Save, Model D, Cub tractor, the product of the Wallis Tractor Co., now is being made at Racine, Wis., the company having moved from Cleveland, O., to the Badger state city recently. The Cub tractor utilizes a four-cylinder motor, having a bore of 6 inches and a stroke of 7 inches. The crankshaft is 2¾ inches in diameter, with five main bearings, the total length of the shaft being 26¾ inches. The cams are cast integral with the camshaft and hardened and ground. The valves are of tungsten alloy steel, there is a hydraulic type of governor and the clutch is a multiple disk with copper asbestos friction surfaces.

Cooling is attained by the use of a Perflex, inclosed, cellular type of radiator. The water is circulated by a centrifugal pump, driven from the front end of the camshaft. Lubrication is of the circulatory type, under pressure, oil being pumped through the bearings continually. The ignition is by K. W. magneto and there is a special impulse starter so that the engine starts on the magneto.

Two speeds forward and one reverse are offered. The shafts are heat-treated alloy steel and the jackshaft is splined for the sliding gears, which are made of special gear steel. The differential is mounted on Hyatt roller bearings.

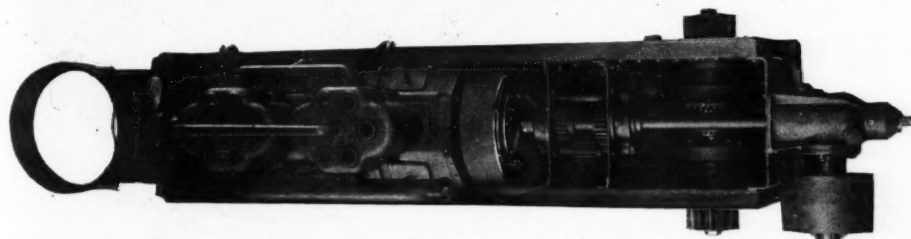
The constant drawbar pull is 4,000 pounds and the maximum is 5,000. It has

a plowing speed of 2¼ miles per hour and a road speed of 3½ to 4 miles per hour. It will plow 10 to 15 acres a day and do about twice as much disking, drilling or harrowing. The total weight is 8,500 pounds.

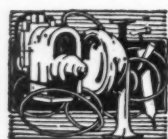
The wheelbase is 8 feet, 4 inches and the width over all is 6 feet, 2 inches. Its height is 6 feet and the length over all 14 feet, 3 inches. The front wheel has a 14-inch face and is 34 inches in diameter, while the rear wheel has a 20-inch face and a 5-foot diameter. The tractor is spring mounted on both front and rear wheels.

NEW CARS FOR MOTOR SHOWS

New York, Dec. 13—During the last week numerous exhibitors were added to the already long list of those who will have space at the national motor shows to be held at Grand Central Palace, New York, and the Coliseum, Chicago, the former opening on New Year's eve. Among the additions to the two lists are several new concerns, including the S. J. R. Motor Co., of Boston, Mass., maker of the S. J. R.; and the Lescina Auto Co., Newark, N. J., manufacturing the new Lescina car, both exhibiting at the Palace. At Chicago, the Princess Motor Car Co., of Detroit; the Walker Vehicle Co., of Chicago, and the Gadabout Co., New York, will be present. The Champion Auto Equipment Co., of Chicago, will show its new Champion model at both shows. Forty-eight new exhibitors of accessories were allotted space, making the total number of accessory exhibits 307, nearly all of whom will be present at both expositions. At present the list of complete car makers for the New York show numbers eighty, and for Chicago eighty-six. There will be seven makers of electric cars at each show.



View showing power plant layout of the Wallis tractor



The Accessory Corner

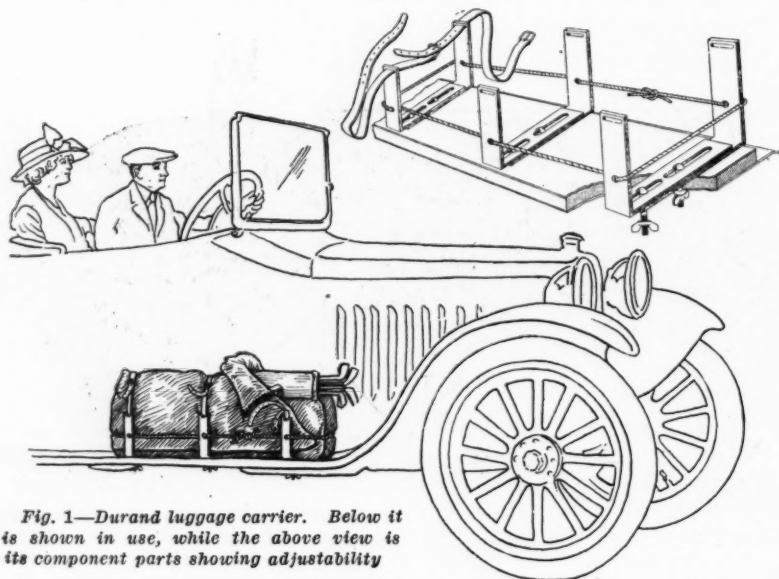


Fig. 1—Durand luggage carrier. Below it is shown in use, while the above view is its component parts showing adjustability

Durand Luggage Carrier

THE Durand-Ferry Mfg. Co., 260 National Life Building, Chicago, has brought out a device for carrying luggage on the running board of the car, as shown in Fig. 1. It has a capacity of six or seven ordinary sized suit cases and quantities of robes, coats, etc., which can be securely fastened, kept clean and dry and handy when needed.

The device, or carrier, consists of three metal upright arms each fitted with two leather straps, bolted to the running board. These arms hold the luggage in place. The carrier is adjustable to fit articles of various sizes as will be noted by referring to the illustration above. By loosening the thumb screws the sliding arm may be moved toward or away from the car as desired. It may be removed from the car readily when not wanted.

The Triplex, or three-arm rack is used for large cars and the Duplex for smaller types. It is so designed that it does not interfere with the rear door and when loaded lightly the front door may be used. Rack, complete, including six straps, rope and water-proof cover, \$8. Duplex size, \$6.50.

Velvet Shock Absorbers

The John W. Blackledge Mfg. Co., Chicago, announces the introduction of a new model of the Velvet shock absorbers as shown in Fig. 2. These are designed for light cars and list at \$25 a set. This absorber is designed on the same general principle as the more expensive Velvet type for heavy cars, which have been on the market for 6 years. The multiple coil principle is used and the appearance is the same as that of the company's previous product, except that all parts are

black enamel instead of nickel plated. The chief difference in construction is that the top and sliding blocks are manufac-

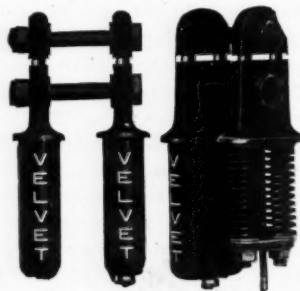


Fig. 2—Velvet shock absorber, which is made in two styles—one for Fords and another for other cars

tured from malleable iron instead of phosphor bronze.

The model for heavy cars sells for \$35 per set and remains unchanged as is also true of the model for Fords, which lists at \$15 a set. They will be exhibited at booth C102 at the New York show and in 102 at the Chicago show.

Babcock Bodies for Fords

The H. H. Babcock Co., Watertown, N. Y., is applying to bodies the quantity idea that has brought about the production of Babcock bodies in thousand lots on the unit plan; eight different types to fit various types of light delivery cars, built up from one standard body base by adding units. One type is shown in Fig. 3.

The Babcock bodies are delivered painted, complete with all fittings and ready to assemble, which is said to be accomplished by the use of a wrench only, with an hour's time. Distribution is being made through the various Ford agencies.

Traveler Puncture-Proof Tires

While Traveler tires are no heavier than other pneumatic tires of equal quality, the manufacturer guarantees them to be puncture-proof and states that they lessen blowout trouble 50 per cent. They are made by the Traveler Tire and Tube Co., Inc., New York, and a cross-section view and one of the tread is shown in Fig. 4.

Of approved construction throughout, these tires have several distinguishing features. The puncture-proof quality is obtained by the use of two unbroken strips of elastic metallic cloth, which completely cover the tread, being vulcanized into the body of the tire. This metallic cloth is said to be ten times stronger than the best quality of fabric.

The inside of the casing is covered with a waterproof lining which protects the fabric and body of the tire from the effects of moisture, as well as imparting addi-

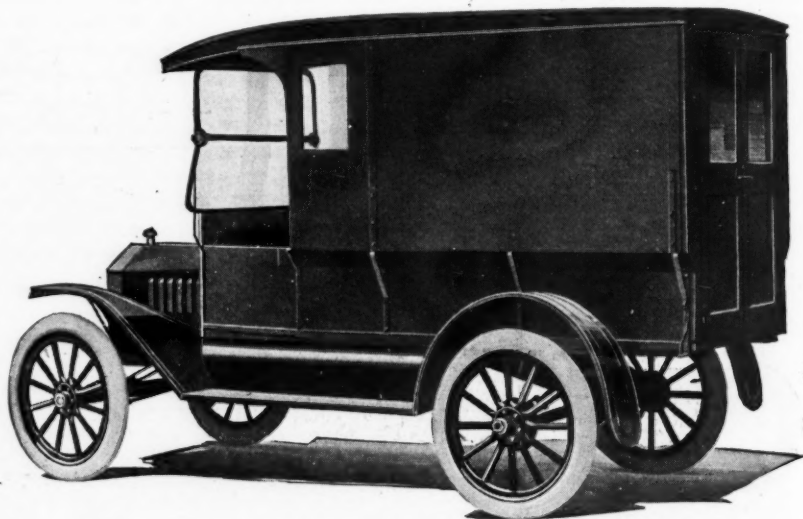


Fig. 3.—View showing Babcock bodies, which are built up of units

tional strength. Above this are numerous layers of fabric under a thick rubber cushion as indicated in the illustration. Above this comes the first strip of metallic cloth, which is first chemically treated and then rubberized, being embodied in the tire structure so that while it is completely surrounded by rubber it is flexible and resilient. Above this is the first breaker strip and the second cushion, after which comes the second strip of metallic cloth, which is not quite as wide as the first. The extra breaker strip, another cushion and an unusually thick clear rubber tread complete the tire.

Another distinguishing feature which may be seen in the illustration is the square formation inside the tread, which not only permits a much thicker tread section, but also prevents straining the fabric at any point. It also prevents the bevel which occurs with the ordinary round tire when not fully inflated, resulting in blowouts.

The manufacturer claims these tires do not overheat. They are guaranteed puncture-proof up to 5,000, a new tire being given in exchange for one defective upon request. They are made in both plain and non-skid treads.

Pro-Mo-Tor Spark Plugs for Fords

The Pro-Mo-Tor spark plug being marketed by Herz & Co., New York, and designed especially for Ford cars, and is shown in Fig. 6. This plug is designed thoroughly to protect it against leakage, moisture, dirt or slush, having a hood and a new type of terminal, the hood being made of stone, and completely inclosing the inner insulation. It has a copper rim on the open end which makes it practically unbreakable. The upper end is formed so as to provide for the entry of the cable.

A peculiarly shaped rubber cap fits over the top of the hood and with the insulated top nut forms the cable connection. There is a mica tube inserted through the cavity in the stone, which is said to

be ample insulation, even should the stone insulation become broken.

Lewis Nojar Clock

The Pennsylvania Rubber Co., Jeanette, Pa., is manufacturing the Lewis Nojar rubber incased clock, the invention of S. G. Lewis, general manager of the company. The clock is incased in pure red rubber, which is said to absorb all road vibrations. As the rubber is non-conducting, the clock is immune from electrical disturbances. The casing fits about the entire clock, leaving only the face exposed. It is shown in Fig. 5.

The clock is stem wind and guaranteed for 2 years. Two models are made, one for the Ford, which is attached to the steering wheel,

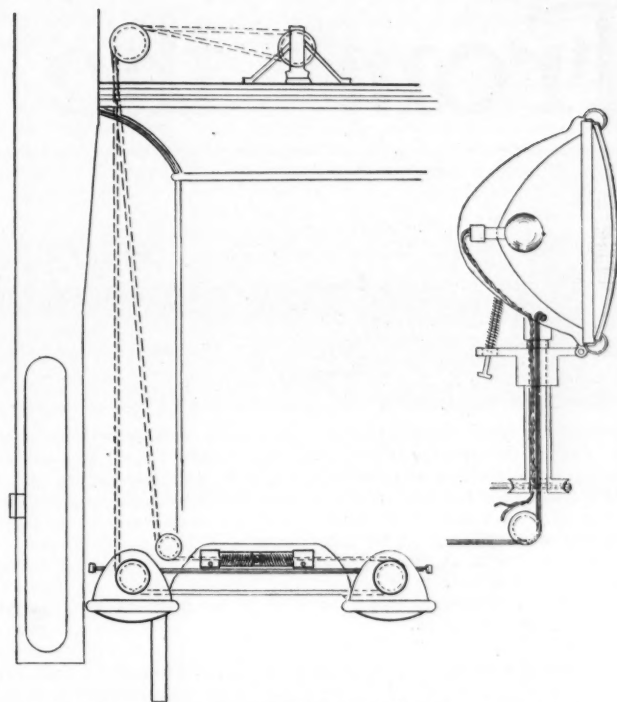


Fig. 7—Wilcox dirigible headlight device, which is operated through cables by a lever and ratchet on the dash



Fig. 4—Traveler tire construction

and the other for dash attachment to all other makes of cars.

Wilcox Dirigible Headlight Device

A practical dirigible headlight device for motor cars is the claim of R. Wilcox, Chicago, whose device was demonstrated for Motor Age a few days ago. By means of this invention the headlights can be rotated at will horizontally and vertically, while the car is in motion or at rest, control being by a small universal lever located on the dash. The lights may be turned to right angles with the car in either direction, and when released automatically are returned to the normal forward position, and firmly held there, so that when not being manipulated they are as steady as the ordinary fixed lights.

A demonstration of this device, which is shown in Fig. 7, reveals the possibility to do practically anything usually done with a searchlight, with the additional feature of having the two headlights moving synchronously.

One of the most serious problems the modern high power electric headlights furnish is that of glare. This is solved by the downward shifting of the lights, without depriving the driver of a sufficient light to make the road safe and he is able to meet the requirements of the dimming ordinances and of courtesy. The lamps are held by a ratchet device at any elevation in the vertical plane.

The principles involved are applicable to any design of car, by varying the details of construction, and the apparatus is very simple, there being nothing unsightly necessitated, and nothing to get loose or rattle. The control is carried from the lever to the lamps by flexible wire cables, passing over small pulleys, and this cable is the only part likely to wear.



Fig. 5—Lewis Nojar clock, which is rubber enclosed and is said to absorb all road vibrations

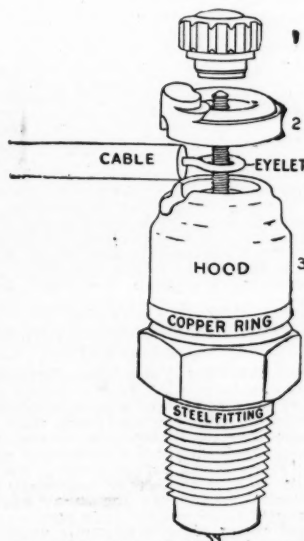
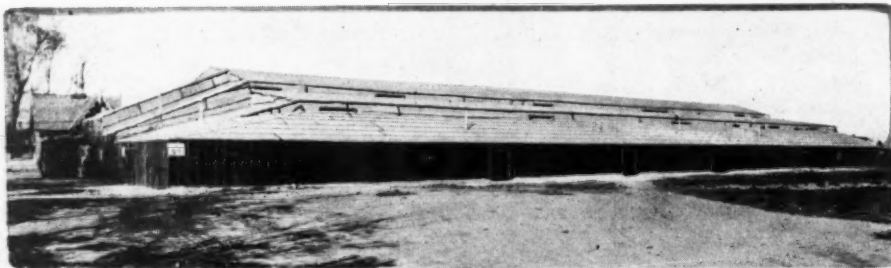


Fig. 6—Herz Pro-Mo-Tor spark plug for Ford cars, designed for protecting terminals

From the Four Winds



TABERNACLE GARAGE—A tabernacle converted into a garage is the latest plan of the J. W. Richley Automobile Co., York, Pa. The company purchased the tabernacle being used by the Rev. William Edward Biederwolf to hold his evangelistic meetings. The price paid for the structure was \$1,500 and the building will be the most novel of its kind in that city. The building will be used by the motor concern for storage purposes and to display cars. The tabernacle is a frame structure 252 feet long and 100 feet wide. It is 8 feet high at the eaves and 26 feet in the center. It seats 9,000 persons. Entrance is gained from all four sides. The structure will be turned over to the new owners immediately after the song service to be held by the evangelistic party on Wednesday evening, December 22.

PRIVATE Chauffeur a Domestic—At a recent meeting of the Workmen's Compensation Board, which will carry out the provisions of the new Pennsylvania act, it was ruled that "the ordinary private chauffeur, while acting as such, is engaged in domestic service within the meaning of the law and is, therefore, not covered by the workmen's compensation act of 1915." The law goes into effect January 1, 1916.

Street Cars Must Signal—The Worcester, Mass., Automobile Club has prevailed upon the officers of the Consolidated Street Railway in that city to order the conductors to signal to all approaching vehicles following behind when the street car is about to turn off on a cross street. This has proven quite a boon to the motorists from out of town who are not familiar with the traffic and where the cars turn.

Can't Hunt from Motor—A bill has been filed at the state house at Boston, Mass., by one of the newly elected members of the legislature to prohibit hunting of any kind from motor cars. The owners of cars have been able to cover a wide territory and secure more game than the law allows, it is said, and they can get it home without being noticed, while other hunters have to carry their game and may be seen by everyone.

Fire Horses vs. Trucks—A statement of how much is saved by operating motorized fire apparatus has been made by Richard H. Johns, president of the Baltimore fire board. He says that when one of the companies used horses only—five in number—it cost \$638.05 a year. Since it has been motorized this amount has been reduced to \$49.94 a year. In neither case, however, is repairs or depreciation figured. The Baltimore fire department will continue to motorize.

Question License Revocation for Intoxication—A case that may mean much in bringing forward a new interpretation of the law regarding intoxicated motor car drivers has been brought to the attention of the Pennsylvania state highway commissioner. A motorist was arrested in October by a member of the state police charged with driving a car while intoxicated and arraigned before a justice of the peace. He was fined \$100 and costs, which he paid. The motorist's attorney, at a hearing before the commissioner, asserted that the action of the justice was illegal inasmuch as the law provides that persons arrested for this offense

must be held for court. The commissioner coincided with this view, but maintained his official right to revoke licenses. The case has been held under advisement.

License Tags in Missouri—C. D. Long, supervisor of the state regulation of vehicles, is making a tour of Missouri in an effort to stop the alleged abuse of the law which provides that a motor car owner shall display the proper license tag on his machine within 15 days after its purchase and which also provides that none other than the tag issued by the secretary of state shall be

displayed on the vehicle. He says that the abuse of this law is common and that his office at Jefferson City had received numerous complaints, which he is at present trying to eliminate.

Missouri Counties Get Road Funds—The Missouri Supreme Court has declared constitutional the state law which gives to special road districts all the money collected by the 25-cent levy fixed by the county courts on property in the districts. The case originated at Moberly, Mo., where the special road district brought a mandamus proceeding to compel the county court to turn over the money collected in the district.

Syracuse, N. Y., Show—The 1916 show of the Syracuse Automobile Dealers' Association will last 6 days. This is the first time in the history of the local exhibitions that the show will be held during an entire week. At first it was held 4 days and during recent years 5. Last winter the crowds were so great that it was decided to extend the time. It will open February 21 and continue through February 26. It will take place, as usual, at the state armory. Arrangements are being made for the biggest and most elaborate exhibition of the kind ever held there.

Squee-Gee Street Cleaners for Milwaukee—As the result of exhaustive tests of a motor-driven squee-gee type, street-cleaning machine made by the department of public works, the city of Milwaukee, Wis., will purchase a battery of such machines early next year. The machines are built by the Kindling Machinery Co., Milwaukee, which has furnished similar horse-drawn equipment for many years. The cost of cleaning streets with the motor-driven type is 16½ cents per thousand square yards of pavement, compared with 38.8 cents by horse-drawn equipment.

Jitneys Bankrupt Atlantic City Railway—Excessive competition on the part of 500 or more jitneys is alleged to be the cause of the Atlantic City and Shore Line being placed into the hands of a receiver. Ex-Judge C. L. Cole was appointed receiver for the company last week. A short time ago the company complained of a deficit of \$80,000 because of jitney competition, but the resort commissioners refused to take any action looking toward their regulation. As a result of the competition the company has lost at the rate of \$300 a day. Paul C. O'Neill, president of the Automobile Service Association, disclaims responsibility for the bankruptcy, and is continuing to run the long line of jitneys without molestation.

Segregate Motor Mechanics' Classes—The second annual 10-week course in the care and repair of motor vehicles given by the university extension division of the University of Wisconsin, started in the branch extension building in Milwaukee December 1. The success of the course a year ago made it necessary to start somewhat earlier so that there will be time to undertake a third course at the completion of the second if the demand from Milwaukee motorists warrants. The course beginning December 1 will be in charge of B. F. Anger, head of the Anger Engineering Co., Milwaukee, builder of custom-made cars. The course is designed to be of benefit to novices who have recently acquired cars, although many experienced drivers participate. To accommodate women motorists, each session will be divided, the women appearing at 4 o'clock in the afternoon and the men

Coming Motor Events

SHOWS

December 31-January 8—New York show.
January 3-9—Importers' Salon.
January 7-13—Milwaukee, Wis., show.
January 8-15—Cleveland show.
January 8-15—Philadelphia show.
January 17-22—Rochester, N. Y., show.
January 17-22—Wilmington, Del., show.
January 18-22—Baltimore, Md., show.
January 18-22—Lancaster, Pa., show.
January 22-29—Montreal, Que., show.
January 22-29—Chicago show.
January 23-30—Portland, Ore., show.
January 24-29—Buffalo, N. Y., show.
January 29-Feb. 5—Columbus, O., show.
January 29-Feb. 5—Minneapolis, Minn., show.
February 7-12—Kansas City, Mo., show.
February 9-12—Peoria, Ill., show.
February 14-19—Des Moines, Ia., show.
February 20-27—Grand Rapids, Mich., show.
February 21-26—Louisville, Ky., show.
February 21-26—Omaha, Neb., show.
February 21-26—Syracuse, N. Y., show.
February 29-March 4—Fort Dodge, Ia., show.
March 4-11—Boston show.
March 21-25—Deadwood, S. D., show.

CONTESTS

May 30—New York City, Sheepshead Bay speedway race.
May 30—Indianapolis speedway race.
June 17—Chicago speedway race.
June 28—Des Moines, Ia., track race.
July 4—Minneapolis speedway race.
July 4—Sioux City speedway race.
July 15—Omaha, Neb., speedway race.
August 5—Tacoma speedway race.
August 18-19—Elgin road race.
September 15—Indianapolis speedway race.
September 30—New York City Sheepshead Bay speedway race.
October 7—Omaha speedway race.
October 14—Chicago speedway race.

at 8 o'clock in the evening. The lectures are illustrated with stereopticon views and practical information is derived from complete chassis loaned by Milwaukee dealers. A small fee is charged for the course, sufficient to defray cost of the work.

Missouri Expects 105,000 1916 Registrations—Basing its estimate on the ratio of increase shown in the automobile registration this year, the State Department of Missouri is making preparations for a motor registration of 105,000 cars next year—almost double the number of cars registered last year and a 33 percent increase over this year's figures.

Toledo Dealers Organize—The Toledo Automobile Dealers' Association, Toledo, O., has been organized by about a score of dealers who are desirous of co-operating in bettering service to patrons. The new organization will work in harmony with the Toledo Automobile Club and the chamber of commerce towards the betterment of traffic conditions in the city. The officers of the new organization are: E. A. Wilkinson, president; J. W. Banting, secretary.

Limits Speed of Trucks—Harry A. Roe, motor vehicle commissioner for Maryland, has taken a decided stand against motor trucks and jitney buses. He has made an investigation and has found that the heavy trucks are going too fast and that the jittneys are being overcrowded. He has sounded a warning. The speed limit for trucks weighing from 4 to 8 tons, has been fixed at 15 miles an hour as the maximum and those weighing over this amount at 12 miles an hour.

Ohio Has New Speed Regulations—The new traffic rules, recently promulgated by the Ohio highway department, became effective December 5. The rules were formulated under the authority of the Ohio general assembly and will be considered as law by all peace officials and judges. The rules, which have been published broadcast throughout the Buckeye state, provide a system of uniform traffic rules and regulation for the entire state, governing city and country alike. The old speed limits of 8 miles per hour in business sections of cities and 15 miles in residence sections and 20 miles on rural highways will continue in force.

Iowans Must Register by April 1—W. S. Allen, secretary of state in Iowa, rules that only owners of motor cars who will not use their cars in 1916 will be relieved of the necessity of registering their machines before April 1. Penalties will be assessed for failure to register by that date. Under the old law owners who did not intend to use their cars before June or July were not required to register their machines before that time, but the new law requires registration before April 1 if the car is to be used at any time during the year. In case cars are not used the registry license is not required, but the cars are subject to taxation in the counties in which they are owned.

Wisconsin Tractor Test in 1916—A demonstration and exposition of farm tractors, which will exceed in magnitude any previous show of the kind, will be conducted on the big farm of the college of agriculture of the University of Wisconsin, near Madison, during the summer of 1916. It will be the first event of the kind to be held in Wisconsin. The promoters include the college of agriculture, Madison chamber of commerce; the agricultural newspapers of the state; the country newspapers of Wisconsin, and the association of farm tractor manufacturers. Rules and regulations to govern the demonstration are now being formulated by the Society of American Agricultural Engineers, of which F. M.

White, Madison, is secretary. It is expected that at least thirty-five and possibly forty tractor builders will participate in the tests.

Springfield, Mo., Show—A. White, manager of the Western Motor Car Co., Springfield, Mo., as chairman of a committee of members of the Springfield Motor Car Dealers' Association, will call the committee together for the purpose of completing plans for holding a show there.

Jeffery Bucks Snow—A Jeffery, driven by Frank C. Riggs, of Portland, Ore., broke all endurance records connected with the history of Mount Hood on November 15 by driving through 10 miles of snow and plowing snow 2 feet deep for the last 4 miles leading up to Government camp, at the base of the mountain. Never before has a motor car reached this point so late in the year, and never before has one attempted to make the trip after the fall snows have come.

Testing Milwaukee Garage Law—The Milwaukee, Wis., city ordinance which prohibits the erection of a garage in residence sections unless the consent of two-thirds of the owners of property within a radius of 300 feet is first obtained, has been declared practically invalid by the circuit court of Milwaukee county, which leaves the question of constitutionality to the supreme court to decide. Lawrence Nehrbass was refused a permit by the city building inspector because he had not complied with the provisions of the ordinance. Mr. Nehrbass carried the case to the circuit court, where the city's demurrer was overruled. The decision intimates that the ordinance

is not legal, but makes no explanation. An appeal has been taken to the supreme court by the city attorney.

Britain Wants Mechanics—The British government has advised Canadian recruiting officers to try especially to get motor car drivers and repairmen, at least 3,000 being needed. The drivers must be able to do repair work in order to qualify. This was reported at the Windsor armory, Windsor, Ont.

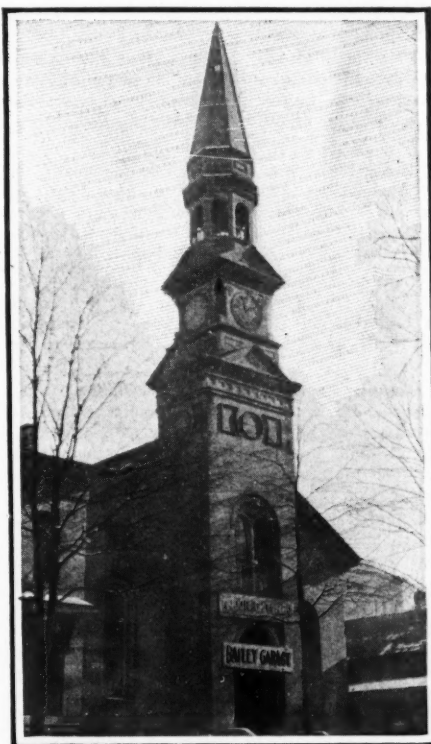
Seal for Approved Headlights—Prof. David I. Gallup, of the Worcester, Mass., Polytechnic Institute, has made a suggestion to the Worcester Automobile Club officials that they communicate with the highway commission to arrange a seal which may be stamped upon headlights that have been found all right under the new headlight law, and in that way prevent the indiscriminate holding-up of motorists night after night to see if their lights are perfect.

Rules 36 M. P. H. Legal Speed—As no life or limb was endangered, judgment against R. N. Rhinelander, who was convicted of speeding in Long Island, when his car was going 36 miles per hour, was reversed at Mineola, L. I., recently. An appeal was made on a \$10 fine which was paid under protest. It was ruled that, although a person driving a car at a rate of speed in excess of 30 miles per hour outside of incorporated villages is presumed guilty of reckless driving, yet it does not follow that such speed is conclusive proof that the driver is endangering the life and property of others.

Garages Protest Customer's Car Registration—Eight garage owners and managers in Joplin, Mo., have declared their intention of testing the validity of the new measure recently passed by the city requiring them to report to the police department descriptions of all cars taken to their garages. The owners declare that this would inflict an unnecessary expense on them, as well as antagonizing their customers. The police require the make, size, model, color, kind of lights, motor, car and license number, tires, horn and the names and addresses of owners and drivers of the cars. Officers believe this will have a tendency to decrease the number of stolen and lost cars.

To Try for Cross-Iowa Record—H. M. Strong and J. A. Thompson, Des Moines, Ia., will try this month to beat the cross-Iowa motor car road record now held by Hal R. Wells, of Des Moines. The record was made 2 years ago in a Spaulding, and Wells set a mark of 38.5 miles per hour, elapsed time, between Davenport and Council Bluffs over the River-to-River road. Strong and Thompson will drive stripped Fords. One will cross the state on the River-to-River road and the other on the Lincoln Highway. They will start from the Mississippi river at the same time, but the River-to-River road car should reach Council Bluffs first, because of the advantage in distance in favor of that road.

Municipal Garage to Check Cars—The Milwaukee, Wis., common council probably will include in its 1916 budget an appropriation sufficient for the reconstruction of the present Armory building, used as a municipal garage, into a modern, fire-proof garage and machine shop. The appropriation will be sufficient to maintain a force of checkers and attendants, so that an accurate check may be kept on every city-owned car and promiscuous joy-riding stopped. The check will include a record of every car taken out, parties using the car, names of guests, mileage in and out, amount of fuel and lubricant used; life of tires, etc. The city owns more than 60 cars and up to this time has been unable to keep records of reasonable accuracy because of the lack of facilities.



GARAGE IN CHURCH—In Grand Rapids, Mich., a dealer was unable to find a good location for his business until he convinced the elders of a Christian Reformed Church that they could do just as good work in the outskirts of the city and thus give him a chance to do some good work himself. He purchased the church and immediately converted it into a garage. Now cars run in and out of the front entrance and the chug-chug of the motor has taken the place of the peal of the organ while the calls of repairmen are rampant where the exhortations of the minister once issued.



Among the Makers and Dealers



PACKARD Resorts to Open Car Shipment—The Packard Motor Car Co., Detroit, Mich., in an effort to solve the present serious shortage of freight cars for shipping cars and trucks, has begun shipping its motor trucks on flat cars, as shown in the above

illustration. Each flat car accommodates two trucks, which are blocked to prevent them from being thrown off the car by the jolts and jars attendant with shipping. It is probable that other Detroit Makers may adopt this practice.

WILLEMIN Resigns from Hupp—A. B. Willemmin, who was assistant general manager of the Hupp Motor Car Co., has resigned.

Packard New York Sales Head—A. C. Harrington, for 13 years a member of the Packard forces, has been appointed sales manager of the Packard Motor Car Co., of New York.

Link Goes to Wilson—Vincent Link, formerly with the Packard Motor Car Co., Detroit, Mich., has been appointed designing engineer of the J. C. Wilson Co., manufacturers of the Wilson truck.

Body Company Begins Operating—The Beach-Cross Body Co., Detroit, Mich., has opened for business, handling the product of the Highland Body Mfg. Co., Cincinnati, O. Commercial bodies for Ford cars are a specialty with the company.

Moore Service Advertising Manager—Paul Moore, has been appointed advertising manager of the Service Motor Truck Co., Wabash, Ind., coming from the advertising department of the Weis Fibre Container Corp., Monroe, Mich. Formerly he was connected for 3 years with the advertising department of the National Cash Register Co., Dayton, O.

Gillette Tire Building—Work has been started by the Gillette Safety Tire Co., formerly of Grand Rapids, Mich., on the first unit of its permanent factory and offices at Eau Claire, Wis., which city recently was selected for this purpose, because of its advantageous location in the northwest and the abundance of cheap water-power at that point. The building will be of reinforced concrete construction, 60 by 250 feet, located on a tract, 300 by 150 feet, and placed so that wings may be constructed as needed. The initial output

will be 100 tires daily. The company is capitalized at \$1,000,000 and has been in existence 2 years, during which time it has contracted for the manufacture of its product with existing tire factories.

Grinnell Discontinues—The Grinnell Electric Car Co., Detroit, Mich., which started in business in 1910 and made the Grinnell electric, has discontinued manufacturing cars.

Jarman Goes to Canadian Briscoe—Walter G. Jarman, who was assistant sales manager of the Briscoe Motor Co., Jackson, Mich., has been appointed treasurer and general manager of the Canadian Briscoe Motor Co., Brockville, Ont.

Wheel Drive for Weler-Smith—The Weler-Smith Truck Co., Birmingham, Mich., which was organized in 1914, has increased its capital stock from \$30,000 to \$50,000 and will bring out a new model truck, 1½-ton capacity, of the four-wheel drive type.

Tracy Michellin Factory Representative—R. B. Tracy, who was central manager for the Michelin Tire Co., Chicago, has been promoted to factory representative, having supervision of the branches in Philadelphia, Cleveland, Chicago, St. Louis, Des Moines, Kansas City and Minneapolis.

201 Pounds of Parts by Parcel Post—The largest package of motor car parts that has ever been sent to a foreign country via parcel post, so far as known, is the shipment made by the Mitchell-Lewis Motor Co., Racine, Wis., through the Racine postoffice, and destined to Petrograd, Russia. Owing to the refusal of the express companies to accept large parcels for foreign shipment, the company was obliged to resort to the parcel post system to facilitate delivery of the parts, which were on a rush order, and believed to be for re-

placement on damaged war cars. The parcel weighed 201 pounds and the postage amounted to \$96.84. It was necessary to use 129 stamps of the 75-cent denomination and a few stamps of lesser denominations.

Wheel Founder Develops Carbureter—John B. Drahonovsky, who founded the J. B. D. Resilient Wheel Mfg. Co., Milwaukee, Wis., has organized the J. B. D. Carbureter Co., with \$10,000 capital, to develop and market further inventions and designs in the motor car field. The new concern will occupy quarters with the wheel company.

Jeffery Adding Two Buildings—The Thomas B. Jeffery Co., Kenosha, Wis., has started work on two large factory buildings, each three stories high, to provide much-needed production facilities in both passenger and commercial car departments. The company has been working night and day for many months and is at this time employing 2,500 men, compared with 1,300 on the payroll a year ago.

Mason Motor Plant Nearly Ready—Second Vice-President A. B. C. Hardy, of the Chevrolet Motor Co. of Michigan, Flint, Mich., announced today that the new plant of the Mason Motor Co., which makes the motors for the Chevrolet company and is controlled by it, is nearly completed and that part of it will be operated within a few days. Men are being added as fast as it is possible to accommodate them and by next April at least 1,000 will be added to the force at this motor plant alone. At the Chevrolet car plant it is expected to add 500 or more, and this would be done at once if enough houses were available in the city. Pending the construction work of the new factory buildings the Chevrolet company has been using parts of the plant of the Monroe Motor Co., also the plant of the old Standard Rule Co. Arrange-

ments have been made whereby the occupancy of these premises or parts of them will be continued indefinitely.

Hyatt Changes Service Managers—L. R. Remington, formerly in charge of the Hyatt direct service branch at Atlanta, Ga., has been made service manager at Chicago. He succeeds J. R. Phillips. R. B. Campbell, recently manager of the service branch at Detroit, Mich., goes to Atlanta, to take charge of the work in that territory. J. W. Taylor, a new man in the Hyatt organization, has been named as service manager at Detroit.

Bowser Employees Share Profits—Under the direction of John Leach, a plan has been evolved at the plant of the S. F. Bowser Oil Tank & Pump works, Fort Wayne, Ind., under which the factory employees only, about 550 in number, will obtain a part of the profits of the company. The first step was the reduction of the shop hours from nine to eight and one-half, with no decrease in wages. The men are to receive their share of the dividend monthly.

New Brooklyn Ford Branch—The Ford Motor Co. has purchased a plot of ground in Brooklyn, N. Y., where a new service station and assembling plant will be erected to take the place of the present service station in Brooklyn. The new building will be of irregular shape, three stories high with basement. In Scranton, Pa., the Ford company will put up a new branch. The three-story structure will be 175 by 90 feet and will conform in style and construction to the other Ford branches.

Cushion Spring Co. Organized—The Premier Cushion Spring Co., Detroit, Mich., has been organized to make cushion springs for motor cars. The capital stock of the company is \$25,000. William D. McCullough, formerly secretary of the Detroit Wire Spring Co., is president; William A. Falls, former factory manager of the Detroit Wire Spring Co. is vice-president, and Joseph A. Schulte, manager of the Detroit branch of the Cadillac Motor Car Co., is secretary-treasurer.

Michigan Tractor Taken Over—The Michigan Tractor Co., Detroit, Mich., recently organized, has been taken over by the A. T. Harrow Tractor Co., the incorporators and officers being the same as those of the Michigan company, namely, A. T. Harrow, president; H. M. Sweet, vice-president, and E. A. Cobo, secretary-treasurer. Temporary headquarters have been established. A plant is being sought either in Detroit or vicinity. The tractor, a model of which is at headquarters, will sell at \$1,100 with the plowing outfit or at \$950 without.

3,100 Would Work for Ford—It was announced on December 1 by A. W. L. Gilpin, manager of the Milwaukee, Wis., branch of the Ford Motor Co., Detroit, that no further applications for employment in the new Milwaukee plant will be considered under any circumstances. There are 400 positions to be filled by the time the new shops open on February 1, and up to December 1, the number of applications exceeded 3,100. The Milwaukee plant is 5 stories high, 300 by 120 feet in area, and will have a capacity of 75 cars daily. It will represent an investment of \$385,000.

Van Speedometers Dodge Equipment—Contracts for supplying 100,000 speedometers for the 1916 output of the Dodge Bros., have been signed by the Van Sicklen Speedometer Co., Elgin, Ill. This contract in addition to others made with the Mercer and New Era company, will necessitate doubling the production. It is planned to turn out 750 per day during the coming year. Fourteen different companies are now being supplied with speedometers. At present 225 persons are employed. This number will be

doubled. Because of the extensive manufacture of war material in this country the company is meeting with difficulty in securing tools.

Sutton Pathfinder Purchasing Agent—A. B. Sutton, formerly assistant purchasing agent of the Pathfinder Co., Indianapolis, Ind., has been promoted to the position of purchasing agent.

Foundry Concern Adding—The Jaeschke Bros. Foundry Co., Milwaukee, Wis., is building a new foundry and pattern shop. It will be of brick, 1-story, 120 by 150 feet, or modern design throughout, and cost \$20,000.

Exhaust Heater Company Organized—The Auto Exhaust Heater Co. has been organized at Grand Rapids, Mich., to make a device to be used for heating automobiles in cold weather. Those interested in the new concern are: Don McAfee, Frank Veit, T. Johnson, Frank Mathison and Neil Kunst.

Tractors in Milk Factory—Negotiations are under way by which the plant of the Borden Condensed Milk Co., Dundee, Ill., may be leased to Henry Ford for the manufacture of farm tractors. The Dundee plant has been operating of late with one-half of the usual force. The plant can be bought, it is understood, for \$200,000.

Sun to Use Beaver Engine—The Beaver Mfg. Co., Milwaukee, Wis., a large producer of internal combustion engines for motor cars and trucks, has booked an order for 3,500 light 6-cylinder motors for the Sun Motor Car Co., Buffalo, N. Y. The motor is of a new high-speed design. Deliveries will start within a few days.

Rittenhouse Leaves Goodrich—L. K. Rittenhouse, who has been connected with the Diamond and Goodrich Rubber companies, for the past 10 years, in charge of a number of their branch houses, will resign as St. Louis manager of the B. F. Goodrich Co. He is going East, but no announcement of his future plans will be made until January 1.

Lake Breeze Motor to Move—The Lake Breeze Motor Co., Chicago, has filed a bond of \$15,000, with the Chamber of Commerce of Oshkosh, Wis., to insure its removal from Chicago to Oshkosh. The company will be re-incorporated at once under the laws of Wisconsin, and C. C. Chase of Oshkosh, who takes a heavy financial interest, will be president. Factory quarters are now being provided in Oshkosh and it is hoped that the company will be in shape to start actual production by March 1 or 15.

Bates Tractor Adding—Extensive additions to the plant of the Bates Tractor Machine Co., Joliet, Ill., are announced. The company has decided to increase the capacity of the plant sufficient to permit the manufacture of 2,000 machines in 1916. It is estimated that \$100,000 will be expended upon new buildings and machinery. Orders now on hand aggregate 1,000 machines and it is anticipated that next season's business will be nearly \$1,000,000. By increasing the capacity of the foundry, sufficient steel castings can be produced to triple the output of the past year. The machine shops will also be enlarged.

Reliance Absorbs Seager—The negotiations tending toward the absorption of the Seager Engine Works, Lansing, Mich., by the Reliance Engineering Co., have been completed and the latter concern has started moving its machinery to the former's plant, whose work shops occupy about 18 acres of ground. The officers of the Reliance company are: C. P. Downey, president; Fred L. Smith, vice-president; E. C. Shields, secretary; J. H. Wilford, treasurer. These officers and Henry Russell, John M. Stalker and B. F. Davis make up the board of directors. The company will start the

extensive manufacturing of parts and will continue to make the gas engines formerly made by the Seager works, it is said. It is expected that within a few months about 1,000 men will be on its payroll.

Missouri Road Funds Swelled—Statistics issued at the Missouri state capital, Jefferson City, show that \$119,035.37, paid to the state for motor vehicle registration, now is available for road improvement. In addition there is available for good road purposes \$23,513 from corporation taxes and \$12,316 from the sale of option stamps.

Duck to United Truck—George H. Duck, who was general service manager of the motor car department of the American Locomotive Co., and president of the Motor Truck Club of America, has been appointed general sales and advertising manager of the United Motor Truck Co., Grand Rapids, Mich.

Ahlberg Bearing in Australia—Negotiations are now under way for the establishment of a branch of the Ahlberg Bearing Co., in Sydney, Australia. It is planned to ship machinery for regrinding bearings under the Ahlberg system to Sydney and supply the entire Australian trade from the factory branch.

Ford 105,289 Orders Behind—On December 8 the Ford Motor Co. had orders on its books for immediate delivery for 105,289 cars, which, however, did not include cars to be shipped this month. In other words this represents the number of cars ordered but for which the company is behind on deliveries. Since the beginning of the 1916 fiscal year, that is, since August 2, approximately 140,000 Fords have been made and shipped. This naturally represents the production and shipments from all the assembling plants throughout the country in addition to the activities of the parent plant.

Myers Machine Reorganized—The Myers Machine Co., Sheboygan, Wis., which has been reincorporated and capitalized at \$50,000, to include the plant and business of the Wisconsin Motor Truck Co., Baraboo, Wis., has awarded contracts for the erection of a 75 by 75-foot shop addition to accommodate the truck shop. The new officers of the company are: President, George P. Myers; vice-president, Louis P. Helm, formerly of Baraboo; secretary, E. R. Bowler; treasurer, Joseph G. Myers. The Myers company will continue to manufacture woodworking machinery. Mr. Helm will manage the motor truck department, which is expected to be in full running order by February 15, but will actually start work January 1. The line will consist of 1,500-pound, 1-ton and 2-ton trucks, worm-driven. Police and fire cars will be made to order. The Myers company now is buying the new equipment needed.

L. P. C. Creditors to be Paid—Under an agreement effected by creditors of the L. P. C. Motor Co., Racine, Wis., which made a voluntary assignment some time ago, it is believed that all debts will be paid in full and the business rehabilitated without the loss of a cent to creditors. As was announced at the time of the assignment, the company practically closed a large contract for cars and similar material. The Corliss Steel Co. of Racine, has been organized by F. Lee Norton, the assignee; Capt. William Mitchell Lewis, president, L. P. C. Motor Co., and Herbert F. Johnson, to handle this contract as well as take over the business of the L. P. C. and assume the liabilities. It is proposed to use a large part of the former plant of the defunct Wisconsin Engine Co., at Corliss, Racine county, to which location the L. P. C. shops will be moved within a short time. The Corliss Steel Co. is licensed to do business on a broad scale in cars, tractors, machinery, etc.

New Garages, Repair Shops and Service Stations

Town	Firm	Supplies
Hanford	Hanford Garage	Willard battery
La Habra	W. H. Redfern	Garage
Lordsburg	O. J. Beaver	Garage
Los Angeles	Gray Taxi Co.	Garage
Merced	Lounsbury & Shaffer	Garage
Pasadena	H. D. Gorby	Willard battery
Redlands	Home Oil Co.	Service
San Rafael	Bogles Electrical Works	Service
Santa Rosa	Jack Flockhart	Willard battery
South Pasadena	Chamver & Holman	Service
Tulare	Electric Garage	Willard battery
Denver	Denver Auto Goods Co.	Simms magneto
Atlanta	E. H. Odom Bros. Co.	Simms magneto
Macon	Macon Elec. Storage Battery Co.	Willard battery
Canton	F. A. Donnelly	Garage
Clinton	W. F. Corrington	Garage
Chesterfield	W. H. Dewa	Garage
Chicago	Northwestern Bat. Charging Sta.	Willard battery
Havana	R. O. Curless	Garage
Huntley	Dolby & Pabst	Garage
Peoria	M. Leinaw	Service station
Peoria	Forney & Knudsen	Garage
Quincy	Collins Plow Co.	Repair shop
Indianapolis	Indiana Electrical Service Co.	Simms magneto
Creston	R. C. Blakely	Garage
Iowa City	Leus & Pepler	Garage
Lisbon	W. J. Flala	Garage
Oskaloosa	Fitch Co.	Accessories
Clay Center	Miller & Reed	Willard battery
Dodge City	Dodge City Vulcanizing & Stor. Battery Sta.	Willard battery

Town	Firm	Supplies
Pittsburgh	Ray Ryan Elec. Co.	Willard battery
Smith Center	George Scott	Garage
Wichita	Mark Runkler	Garage
Baltimore	Ir. Theodore Cook	Garage
Baltimore	Monumental Motor Car Co.	Service station
Baltimore	Storage Battery Service Co.	Service station
Worcester	Alvan T. Fuller	Service station
Marquette	James McClure	Garage
Albert Lea	Albert Lea Storage Bat. Co.	Willard battery
Balaton	B. H. Morrison	Garage
Breckenridge	Lawrence Finlayson	Garage
Blue Earth	F. J. Barnes	Willard battery
Benson	Nelson Auto Co.	Willard battery
Crookston	National Garage	Willard battery
Duluth	Kelley Hdw. Co.	Simms magneto
Farmington	Johnson & Elstad	Garage
Menahga	Oscar Gronlund	Garage
Minneapolis	Reinhard Bros. Co.	Simms magneto
Virginia	H. B. Knudson	Garage
Chillicothe	Chillicothe Battery & Supply Co.	Willard battery
Galt	Browning & Lane	Garage
Memphis	William B. McLane	Garage
Richmond	E. J. Riesling	Garage
Ridgway	Edward Erickson	Garage
David City	David City Battery Service Station	Willard battery
Newark	Essex Storage Battery & Supply Co.	Simms magneto
New York	Ignition Specialties Co.	Simms magneto

Town	Firm	Supplies
Ryder	A. Fyall	Repair shop
Cleveland	Albough Motor Sales Co.	Service
Columbus	James W. Day	Service
Columbus	Bennet & Davies	Tire repair
Dayton	Edwards-Sutton Specialty Co.	Simms magneto
New Philadelphia	West End Garage	Willard battery
Toledo	Schafer-Bowling Tire & Rubber Co.	Kelly Springfield tires
Lawton	Wolverton Elec. Co.	Willard battery
Portland	Fehr & Herd	Exide batteries
Portland	Otto Welmer	Service station
Altoona	Imperial Garage	Garage
Beaver	Beaver Garage & Sup. Co.	Garage
Fullerton	Appelquist & Paulson	Garage
Amarillo	Panhandle Motor Co.	Simms magneto
Dallas	Atlas Tire Co.	Tires
Dallas	Dallas Magneto & Starter Co.	Simms magneto
El Paso	L. W. Teel	Garage
Floresville	Johnson & Moore	Garage
San Antonio	Atlas Tire Co.	Tires
San Marcos	W. W. Giesen	Willard battery
Brattleboro	W. H. & Webster Jones Co.	Willard battery
Seattle	Ard M. Peterson	Tires
Seattle	Pacific Tire & Rubber Co.	Gordon tires
Tacoma	Cole & Spengen	Garage
Tacoma	Hansen & Hansen	Repair shop
Kingston, Ont.	I. Lesse	Willard battery

Recent Agencies Appointed by Motor Car Manufacturers

Town	Agent	Make
Safford	W. V. Thorpe	Maxwell
Tucson	Southern Arizona Motor Co.	Saxon
Glendora	V. H. Cowser	Maxwell
Los Angeles	Geo. I. Lurkin & Co.	Pathfinder
Pasadena	Goodell & Brooke	Chevrolet
San Luis Obispo	California Garage	Maxwell
Stockton	Tourists Garage	Oldsmobile
Denver	Elmore Auto Co.	Pilot
New Haven	Duray-Easner Co.	Regal
Washington	Ingraham Boston Corp.	Glide
Peiham	Drake & Thompson	Oldsmobile
Alton	Alton Carriage and Horse-Shoping Co.	Maxwell
Belleville	Charles Procksky	Maxwell
East St. Louis	Selfert Auto Co.	Maxwell
Edwardsville	Peter Bernhardt	Maxwell
Hirdin	Kingdom Garage & Supply Co.	Maxwell
Havana	R. O. Curless	Reo
Quincy	Great Western Motor Sales Co.	Maxwell
Connersville	Alfred Ayers	Pilot
Gary	C. B. Geiger	Pilot
Madison	Chas. Hill	Pilot
New Albany	A. I. Shradler	Pilot
Richmond	McConaha Company	Pilot
Rushville	Byron S. Cowling	Pilot
Cedar Rapids	John E. Elgin	Pilot
Creston	R. C. Blakely	Saxon
Harlan	M. M. Nelson	Oldsmobile

Town	Agent	Make
Kingsley	C. C. Cunningham	Oldsmobile
Sioux City	Wetmore Automobile Co.	Cadillac
Baton Rouge	Pomer-Ferguson Co.	Pilot
Baltimore	Auto Supply Co.	Wonder Mist
Boston	Phil Hawley	Saxon
Spencer	L. F. Rondeau	Studebaker
Portland	A. E. Darling	Chandler
Greenville	G. A. Rasmussen	Ford
Jackson	Hoffnagle & Capron	Oldsmobile
Port Huron	George E. Yokom	Franklin
De Soto	Hubbard Bros.	Maxwell
Jefferson City	Capital City Wagon Co.	Oldsmobile
Mehville	Mehville Motor Car Co.	Overland
Mehville	Mehville Motor Car Co.	Chevrolet
Moberly	C. L. Leitch	Maxwell
New Haven	Otto Buchholz	Maxwell
St. Louis	J. J. Carter	Maxwell
St. Louis	McFarlan Motor Sales Co.	McFarlan
St. Louis	Ebbeler Motor Car Co.	Pathfinder
Sullivan	Sites & Lefman	Maxwell
Judith Gap	McClelland & Fredericks	Oakland
Manhattan	Auto Inn	Franklin
Camden	Walnut Street Garage	Oldsmobile
Hightstown	Hightstown Garage	Oldsmobile
Morristown	Chester C. Henry	Oldsmobile
Albuquerque	J. Korber	Franklin
Bolton Landing	J. L. Maranville	Oldsmobile
New York	F. W. Wright, Inc.	Pilot
Spring Valley	Judge Auto Co.	Oldsmobile

Town	Agent	Make
Greensboro	Guilford Motor Car Co.	Pilot
Rocky Mount	Wm. G. Weeks	Pilot
Ashtabula	Geo. H. Smith	Pilot
Hebron	C. A. Pence	Pilot
Zanesville	United Garage	Pilot
Albany	J. L. Irvin	Chevrolet
Corvallis	Mark Richard	Chevrolet
Dallas	Harry Walthers	Chevrolet
Pendleton	Ben F. Trombley	Chevrolet
Vale	Charles Copel	Chevrolet
Glassport	Cyril C. Schwerha	Pilot
Johnstown	Pennsylvania Pilot Company	Pilot
Masontown	Morristown Motor Car Co.	Pilot
Perkasie	R. R. Suter	Oldsmobile
Philadelphia	Frank Kramer	National
Philadelphia	Raymond Hawley	Pilot
Reading	Wm. Q. Young	Pilot
Providence	Adams & Knight	Grant
Mitchell	W. H. King Auto Co.	Reo
Austin	Thomson Motor Car Co.	Scripps-Booth
El Paso	Marion Auto Sales Co.	Marion
Houston	J. M. McDade Auto Co.	Dort
Stamford	J. R. Miller	Glide
Salt Lake City	C. A. Quigley	Dort
Ephrata	R. T. Tolliver	Chalmers
Spokane	Foster-Larson Co.	Paige
Spokane	Foster-Larson Co.	National
Spokane	Geo. H. Gallagher Co.	Oldsmobile
Tacoma	Cliff & McFarland	Oldsmobile
Green Bay	Lucia Bros. Motor Co.	Franklin

Albany, N. Y.—Continental Auto Heater Co.; capital stock, \$50,000; incorporators, A. R. Oakley, C. A. Cole, R. A. Van Voorhis.

Albany, N. Y.—Nelson Truck Tire and Wheel Shop; capital stock, \$5,000; incorporators, J. L. Nelson, H. D. Nelson, Lincoln Tyler.

Albany, N. Y.—Universal Automobile League; capital stock, \$50,000; incorporators, C. G. Price, Louis Radbill.

Brantford, Ont.—Maple Leaf Motors; capital stock, \$750,000.

Chicago, Ill.—Davis Automobile Co., to deal in and manufacture motors, motor cars, accessories; incorporators, C. W. Stockwell, C. G. Hendricks and L. H. Marks.

Chicago—Pioneer Automobile Supply Co.; capital stock, \$10,000; incorporators, C. W. Garner, James Garner, R. C. Reichart.

Cleveland, O.—Albough Tire & Service Co., to manufacture and sell motor car tires; capital stock, \$10,000; incorporators, T. K. Albough, L. W. Gates, W. A. Albough, E. C. Jefferies and M. M. McIntyre.

Cleveland, O.—Apperson-Cleveland Co., to buy and sell motor vehicles; capital stock, \$5,000; incorporators, A. F. Reed, J. K. Lee, X. M. Ennes, A. B. Curtiss and C. M. White.

Cleveland, O.—Horton Co., to manufacture and sell motor car tops and accessories; capital stock, \$25,000; incorporators, George W. Scott, W. R. Horton, G. R. Agate, H. C. Temple and P. C. Slocum.

Dallas, Tex.—Dallas Chalmers Motor Co.; in-



corporators, J. H. Connell, W. B. Connell, J. S. Connell.

Detroit, Mich.—Automatic Safety Tire Valve Co.; capital stock, \$25,000; incorporators, E. B. Keith, C. F. Smith and John Watchpocket.

Dover, Del.—Pittsburgh Regal Car Co.; capital stock, \$100,000; incorporators, W. M. Boyd, W. I. Lifand, G. W. Morgan.

Evansville, Ind.—Dixie Motor Co.; capital stock, \$10,000; incorporators, H. Haynes, O. C. Hartmetz and C. F. Hartmetz.

Hannibal, Mo.—True's Taxicab Co.; capital stock, \$3,000; incorporators, W. P. True, Rebecca A. True and A. W. Mills.

Kansas City, Mo.—Motor Specialties Co.; capital stock, \$15,000; incorporators, E. J. Hess, W. D. Mahaney, O. J. McClaughery.

Kansas City, Mo.—Prospect Center Garage Co.; capital stock, \$2,000; incorporators, John A. George, R. Conover, H. C. Smith.

Kittery, Me.—Traveler Tire & Tube Co., to manufacture and deal in tires, tubes and supplies; capital stock, \$150,000.

Lima, O.—Lee-Russell Motor Car Co.; capital stock, \$10,000; incorporators, Ward J. Lee and others.

Louisville, Ky.—Hoag's Auto Repair Shop; capital stock, \$1,000; incorporators, W. L. Jones, E. H. Hoag, S. C. Miller.

Louisville, Ky.—Peoples' Motor Co.; capital stock, \$5,000; incorporators, B. F. Bloch, J. G. Bloch and W. S. Heldenberg.

Meadville, Pa.—Simplex Mfg. Co.; capital stock, \$25,000; incorporators, L. L. Lard, W. S. McGunagle, Charles Velth, Charles Fahr, P. W. Kaufner and others.

Montreal, Can.—Raold Motor Co.; capital stock, \$20,000.

Mount Brydges, Ont.—Canadian Crow Motor Co.; capital stock, \$100,000.

Newark, N. J.—Universal Motor Car Co.; capital stock, \$25,000.

New York—Diamond T. Motor Truck Co.; capital stock, \$50,000; incorporators, G. E. Cimling, E. W. Drecktrake, P. E. Porter.

New York—National Motor-Vim Distributors; capital stock, \$250,000; incorporators, B. Stoew, W. C. Freeman, S. L. Davis.

New Westminster, B. C.—Blue Funnel Motor Line; capital stock, \$10,000.

DIXIE 20th CENTURY IGNITION



Leaders in World's Ignition

DIXIE Magnetos

4-Cylinder	Engine Speed	6-Cylinder	1½ Engine Speed
8-Cylinder	Engine Speed	12-Cylinder	1½ Engine Speed

New principles on which they operate make them the best ignition system in the world—in simplicity, in effectiveness and in life of operation



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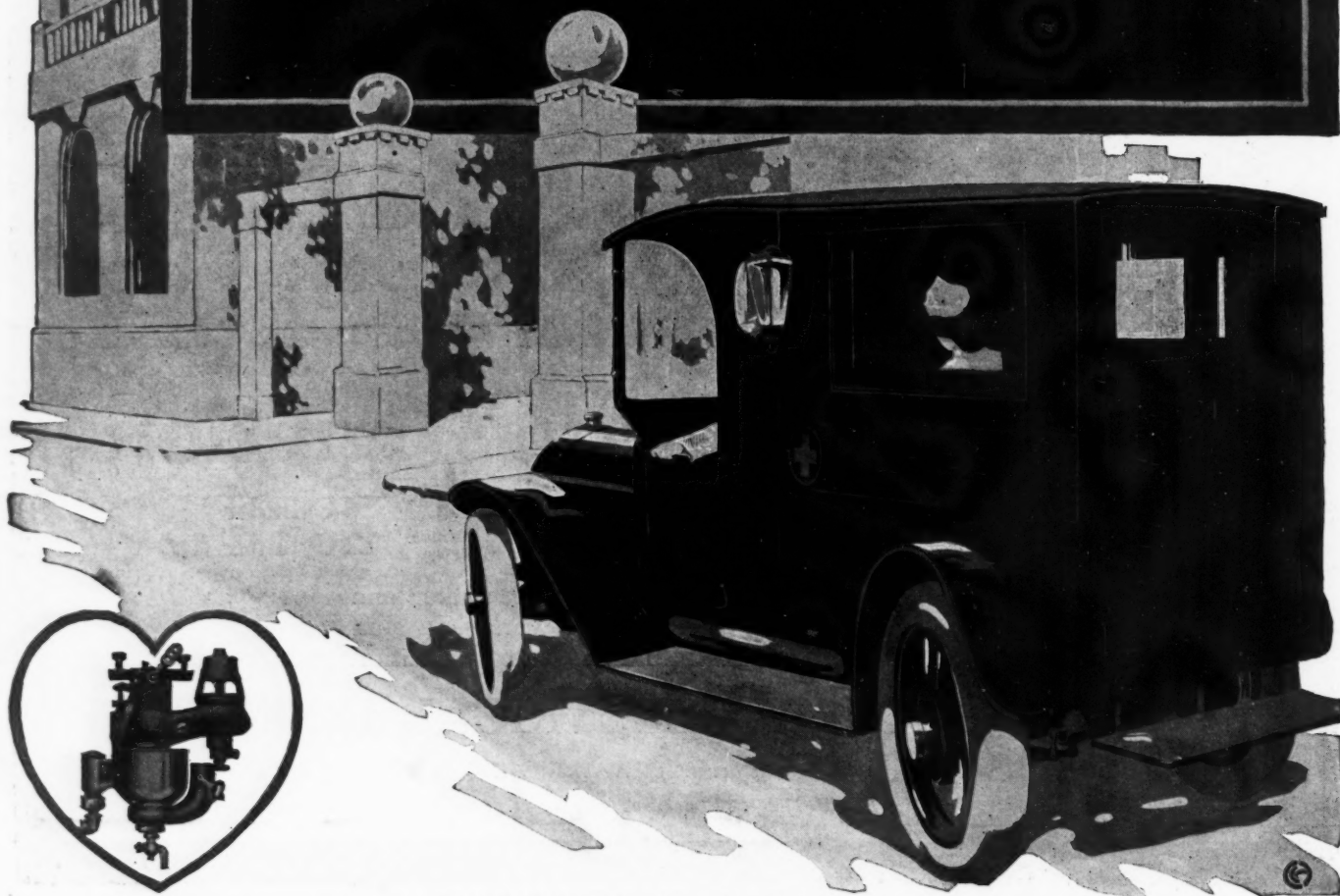
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Dependability in emergencies has made SCHEBLER first choice of the leading manufacturers of police, hospital and army ambulances. Too much hangs on the fraction of a minute to run chances.

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Factory.....ELGIN NATIONAL WATCH CO.

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Eastern Distributors:

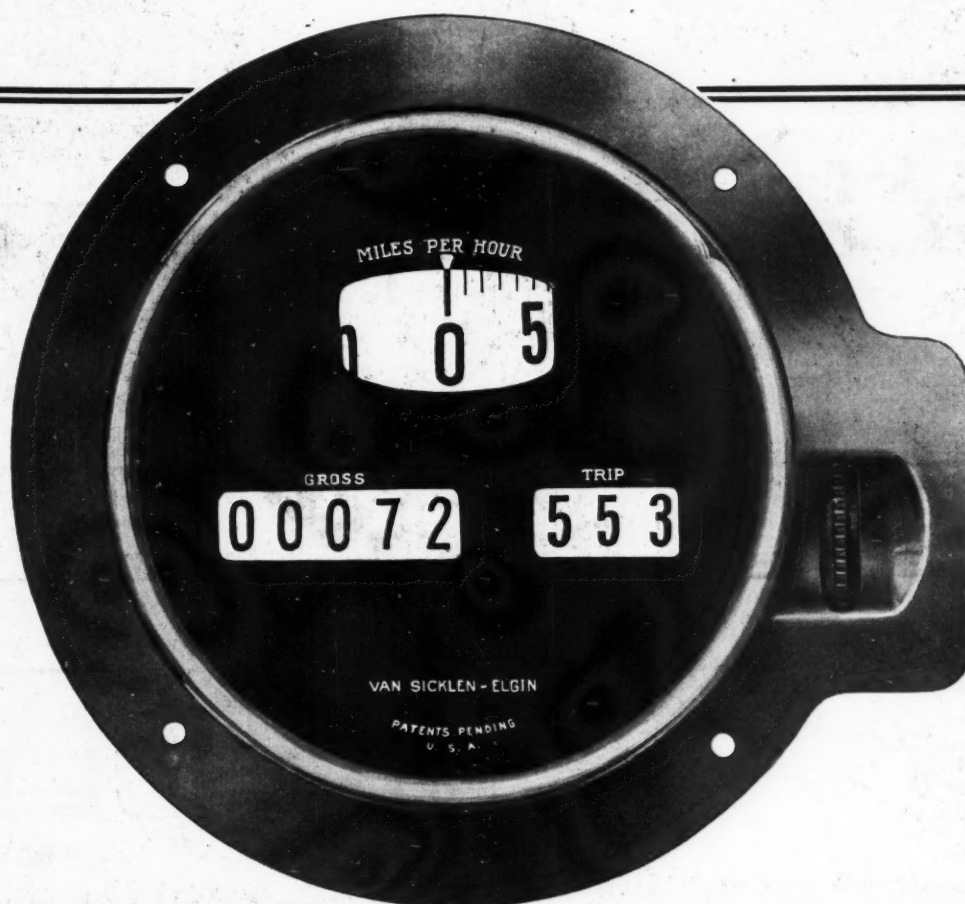
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Just as great nations prepare for the dangers that now and then threaten their peaceful existence—so the wise motorist rides prepared for the *unusual* as well as the *usual* conditions that beset his way.

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is the unfailing recourse of the motorist when safety lies in a quick, certain stop. That is why it is used as original equipment by the majority of leading car-makers, who will have nothing but the best Brake Lining and Clutch Facing in their cars. And because it is made with military precision—because it conforms to the most exacting scientific tests—Multibestos is the Brake Lining found in so many of the powerful war-trucks in service at the front.

Practically any Dealer, Garage or Repair Shop Owner will tell you Multibestos is proven superior in braking ability, durability and heat resistance—and why.

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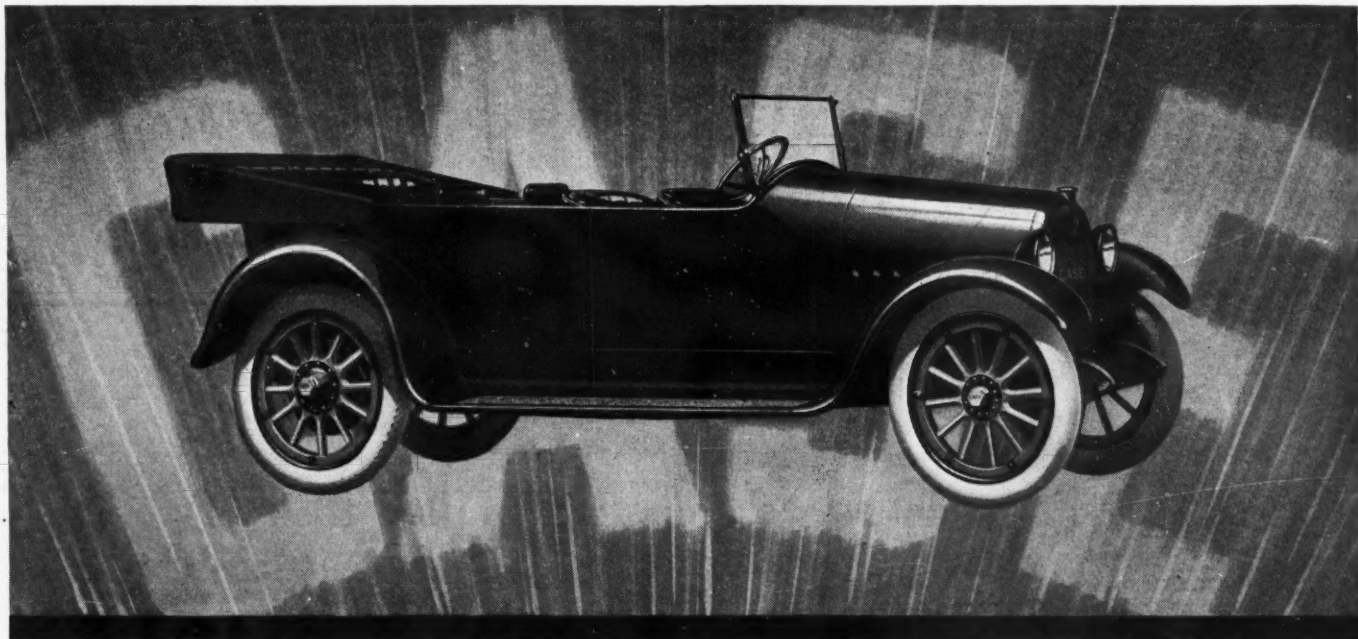
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The Logic of the Case Car from the Dealer's Standpoint

It is an acknowledged fact among dealers that the public is more determined than ever to buy automobiles from the basis of inbuilt merit.

Likewise, there is a feeling among many makers that they would like to raise the prices of their cars to meet this new attitude of the buying public. Some have already raised their prices. Others would like to.

With these two principles established in the motor-world—new recognition comes to Case.

First: Because of our consistent adherence to a policy of producing a car of conscientious merit. Through all these years we have built well—making price secondary. From year to year, as we have progressed, we have steadily decreased the price of Case Cars—never at any startling declines, but just as much as could be afforded without risking their merit.

Second: Because we are prepared again to lower the price of our 40—maintaining that same standard of excellence which has made our name. The new Case 40 is a better car than we ever built before. It could have been made much lower in price if we had been willing to gamble with our reputation.

The buying public, we know, will be satisfied more in the long run by a continuance of Case policy. Hence the great value to dealers.

Reputation is nowadays selling cars. People first want their confidence well founded, then they seek a car of dignified grace. If anyone wants to go deeper—you can go thru the Case 40 with a microscope, revealing at every point intelligent design and good honest construction. This is the car, we believe, that will last and make friends and money for dealers.

Case dealers, under our new agreement, can now profit to the fullest extent by the increased Case demand. In short, the Case proposition offers you the following:

1. A meritorious car.
2. A reasonable price.
3. A reliable company.
4. An International Sales Organization.
5. An attractive dealer's agreement.

Case dealers now have a great opportunity to please the public and make friends. The announcement of our new

40 and the subsequent advertising will tell people of Tomorrow's Car Today. More and more people are coming to appreciate the value of Case reputation.

We shall be glad to explain fully to you our new proposition. We invite correspondence in relation to the establishment of new Case dealers. We still have a number of splendid opportunities. But, since we have an exceptional proposition, we are looking for exceptional representatives.

J. I. CASE T. M. COMPANY, Inc.
507 Liberty Street, RACINE, WISCONSIN

Founded 1842

(361)

ANNOUNCING THE NEW
CASE 40
\$1090

A Few Points for Your Guidance

WHEEL BASE: 120 inch. **MOTOR:** Four cylinder, bore 3 3/8 inch, stroke 6 inch, cylinders cast en bloc integral with crank case, L Head, 40-45 B. H. P. Westinghouse ignition, starting, lighting. Lubrication—Force feed to crank shaft and cam shaft bearings; splash to piston pins and cylinder walls. Carburetor of special design, with feed by gravity from cowl tank, dash adjustment. Radiator—Cellular type, with thermo-syphon circulating system. **CLUTCH:** Cone. **TRANSMISSION:** Selective, three speeds forward and one reverse; three point suspension, in unit with power plant, left hand drive, center control, Timken bearings, Spicer universal joint. **AXLES:** Rear—Weston-Mott; 3/4 floating, with spiral bevel gears; torque and drive thrust taken by torque tube to rear end of transmission through a ball and socket joint; pinion shaft provided with two Bock roller type bearings. Front—I beam, designed and built by Case; Timken bear-

The Sign of
Mechanical
Excellence

The World Over

ings: I beam section, steering arms, steering knuckles and king pins all of special chrome nickel steel—forged, heat treated and machined in our shops. **FRAME:** Designed with exceptionally deep section, greatest depth at center where front hanger of cantilever spring is suspended. **SPRINGS:** Rear—Cantilever, 50 inches long, 2 1/2 inches wide; attached to rear axle by means of universal joints, which take all side play, allowing springs to do full spring duty—an exclusive feature in construction. **WHEELS:** 3 1/4 inch. Artillery type, with Goodyear detachable, demountable rims. **BODY:** All steel, with removable upholstery of genuine grain leather. Front seats divided, and are adjustable forward and backward, as are the clutch and brake-pedals. Finish—Brewster green, with ivory stripe. **EQUIPMENT:**—One-man top, with dust hood and quickly adjustable side curtains. Stewart-Warner Speedometer. Windshield—Rain vision, ventilating. Tires—Goodyear 3 1/4 inch, non-skid on rear. Motor-driven horn. Regular tools, tire repair kit, etc., etc. **PRICE:** \$1090, f. o. b. Racine.

Did You Receive The November Issue of the BOSCH NEWS?

THE Bosch News has been mailed to every wide awake automobile dealer now on the Bosch List of Live Wires.

If you failed to receive your copy some one may have side tracked it because of its meaty reviews. Or, perhaps you have not sent in your name to be put on the Live Wire List.

It is very easy to get there, and well worth your while, for only then can you be kept advised concerning the new Bosch Products as they are announced, and receive the helpful Bosch booklets and bulletins.

Fill out the coupon below, pin it to your letter-head (that is necessary) and mail it. This really is important to all wide awake dealers—tear out this page and attend to the suggestion now.

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214 West 46th Street, New York, N. Y.

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IF AGENT, GARAGE, ETC.

Firm Name.....

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What cars do you sell?.....

Agent	Garage	Repairs	Supplies	Motorcycles	Motorboats



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Don't pay the expressman a big profit to do your hauling, and don't support an extra truck or a team, when your pleasure car and a ROGERS Indestructible Steel Trailer will do the work at minimum expense and with maximum efficiency.

Attached to any make or model of car—commercial or passenger. No unsightly couplings to mar the appearance of your pleasure car. No undue strain on the motor. Easiest and quietest-running trailer. Takes your pleasure car out of the expensive luxury class, and makes it a paying partner in your business.

Rogers Indestructible Steel Trailers

—are in use at big profits by farmers, dairymen, millers, plumbers, coal dealers, baggage and expressmen, piano salesmen, lumber dealers, contractors, grocers, and dozens of others, where only expensive delivery service or a motor truck could take the place of an economical, money-saving ROGERS Trailer.

Built of open-hearth steel, riveted throughout. No bolts or screws to work loose. No rattle or squeak. No breakdowns. Every part guaranteed to be free from imperfections in workmanship.

Capacity, 1000 lbs. or 1 ton. Springs, semi-elliptic, oil tempered, heat treated. Axles, square bed, special steel. Wheels, second growth hickory. Tires, solid rubber. Painting, green body with red running gears. Weight, 545 and 405 pounds.

Write today for free illustrated catalog. It may save you the price of a new truck, or the loss of a valuable customer, through slow and inefficient delivery.

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ALBION, PENNSYLVANIA

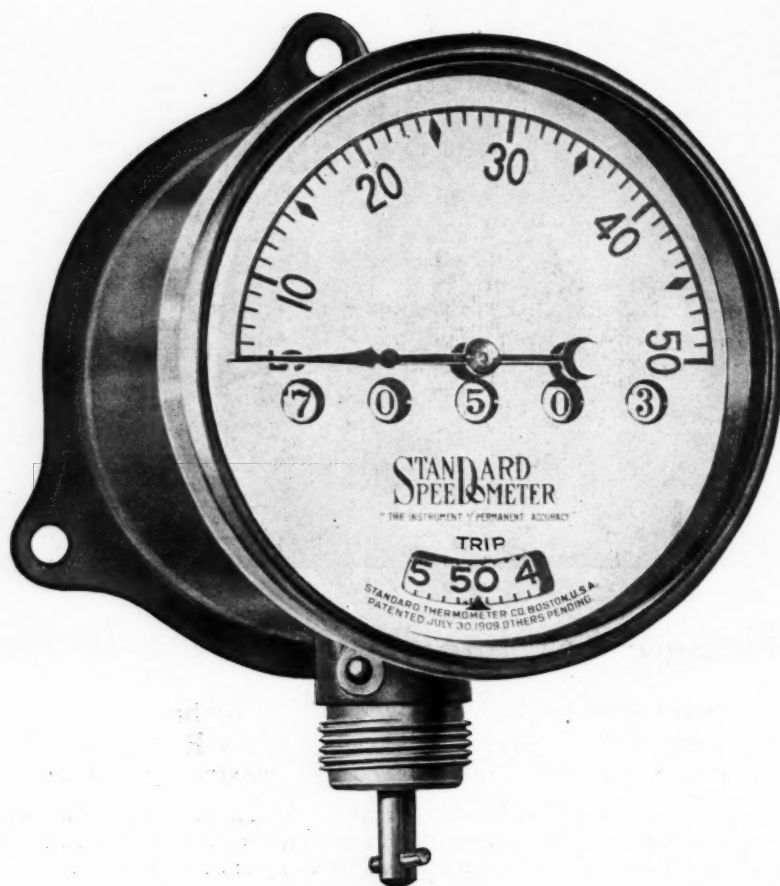
Model A
Capacity
1 Ton

Also
Model B
1000 lb.
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Ford Type

You Who Sell the FORD or Will Find a Big STANDARD

THE FORD TYPE

is practically the same as that used as standard equipment on Ford cars until a short time ago, and has been fully indorsed by the Ford Motor Co.'s engineers. Our new pressed steel bracket makes possible a much stronger speedometer installation than we or anyone else have ever offered before. **List, \$12**

New York Show
Space C-100

Both of these sensationnally-priced cars are delivered from the factory without speedometer equipment, and in each of them, as in the Standard Speedometer, the broad, basic principles of great accuracy, sturdy construction, quantity production and reasonable price are worked out to their greatest possible development.

Magnetic attraction may vary and lose its force; temperature and humidity are bound to affect air pressure; but centrifugal force—the basic principle in the design

Standard Thermometer

When Writing to Advertisers, Please Mention Motor Age

*Chevrolet Type*

CHEVROLET "Four-Ninety"

Selling Help In

Speedometers

of Standard Speedometers—is as unchanging as the movement of the planets.

We intend each Standard Speedometer to perform consistently until legitimately worn out—and this intention is backed up by our fifty factory branches and service stations, strategically located throughout the United States and Canada.

Write today for details of our proposition for Ford and Chevrolet dealers.

THE CHEVROLET TYPE

is arranged for flush mounting on the control board of the new Chevrolet "Four-Ninety." The reset button for the trip dial projects through the nickel flange of the flush mounting where it is easily reached for resetting. Rim and dial are black with indicating hand and big liberal figures in white. The right-hand front hub of the Chevrolet "Four-Ninety" is bored at the factory to take the drive sprocket furnished with this speedometer. **List, \$15**

meter Co. 67 Shirley Street
78-14 Boston, Mass.

*Chicago Show
Space No. 21*

When Writing to Advertisers, Please Mention Motor Age

Badger Jacks

Guaranteed Trouble-Proof

The average jack today is a disgrace to the automobile trade. A jack is made to lift a car. If it doesn't it's a piece of junk. Automobile manufacturers have demanded the latest and best in tires, wheels, and rims. These parts are as perfect as men now know. But the jack has been neglected. Yet it is the direct cause of three-fourths of the hardship in tire changing.

Present day jacks have been skimmed in quality to meet a low price. It is impossible to make *working* jacks for thirty-nine cents.

For five years the Walker Manufacturing Co. have been builders of Badger Jacks. Today we are the largest makers of high-grade automobile jacks in America. Last year 200,000 Badger Jacks were sold. That means 200,000 motorists banished tire changing misery.

Every Badger Jack is subjected to a lifting test of twice the weight the jack is ever required to support when placed in use. No other jack we know of passes such a rigid test.

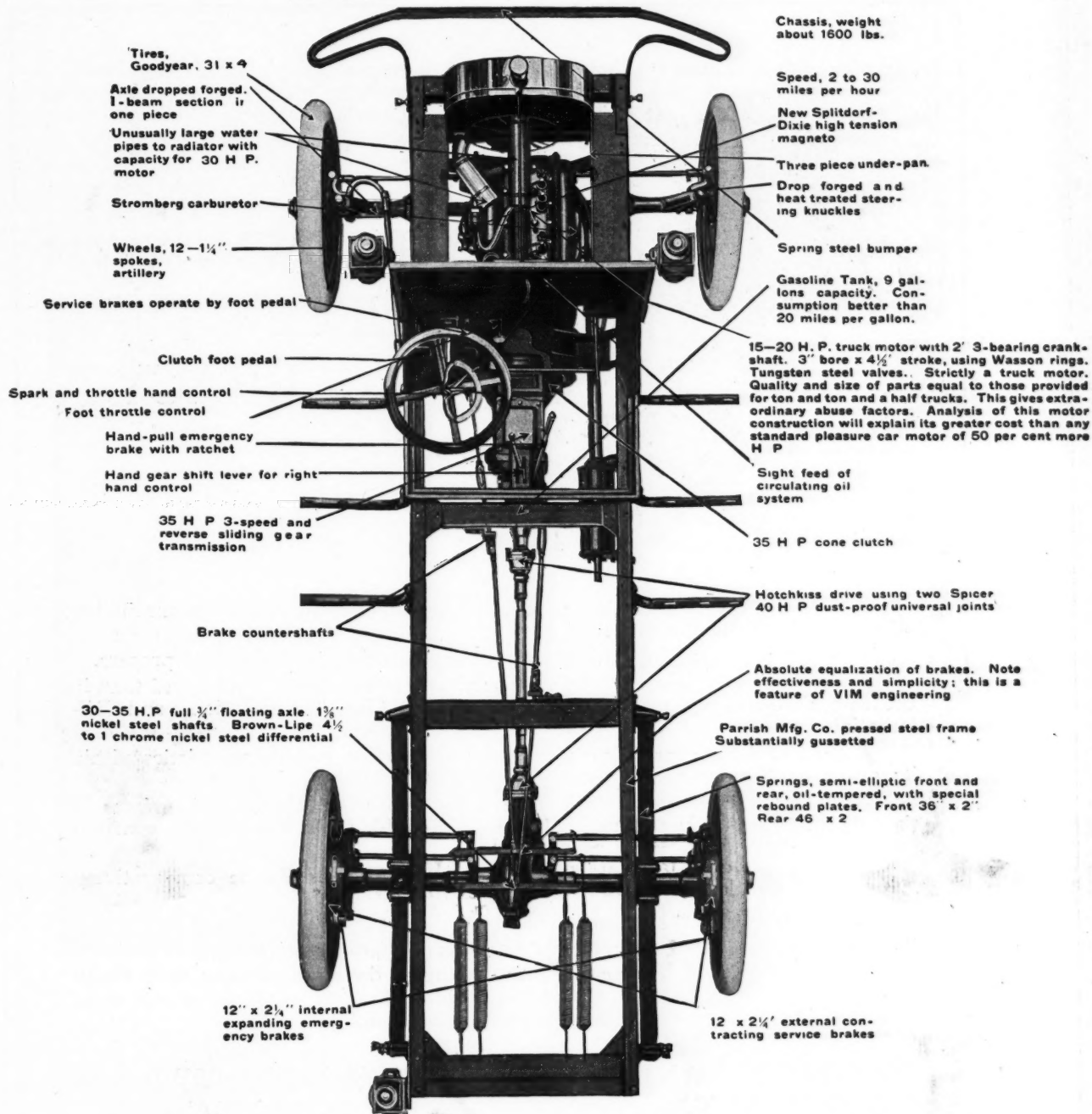
Badger Jacks are guaranteed. If a single defect develops, we give you a new jack free. Write us today for startling new book, "The Story of a Jack."

WALKER MANUFACTURING COMPANY
326 Wisconsin Street, Racine, Wis.



When Writing to Advertisers, Please Mention Motor Age

WE have not made extraordinary claims in the past, but we now merely state facts when we claim absolute dominance of the light truck field. Dealers in 328 cities are making money selling VIM Delivery Cars, and we are now erecting a million dollar plant at 23d and Market Streets, Philadelphia, being the third big plant which we have built in eighteen months in an endeavor to keep pace with the demand.



One Chassis Only

Seven Body Types, \$620 to \$725

This now famous VIM Chassis has made us the world's largest exclusive producers of motor trucks

Made in Philadelphia by the
Vim Motor Truck Company
 Sold in 328 Cities in the United States



When Writing to Advertisers, Please Mention Motor Age



Fractured gears showing case hardening results. Lower piece faulty—no case hardening. Upper piece good. Note hard strip around edges of fracture at right of good gear.

BROWN-LIPE ACCURACY

ACCURACY—in Brown-Lipe practice—is in no wise limited to the machining operations and their inspection.

It is just a natural attribute of every manufacturing operation and process.

And nowhere is accuracy and its importance more clearly emphasized than in the case hardening of the gears used in Brown-Lipe Transmissions and Differentials.

A gear, to deliver maximum efficiency, must possess two characteristics within its structure—hardness and toughness.

The surface of the gear, which is constantly in contact with the surfaces of the opposing gears, must be so hard as to resist the wear due to this constant contact.

At the same time the body of the gears, or the core must be comparatively soft, strong and very tough.

If the whole gear tooth were hard enough to resist the wear caused by the contact of the gears in mesh then the gear would be so brittle as to be liable to fracture.

On the other hand, if the entire gear, including the tooth surfaces, were tough enough to withstand fracture, then the surfaces of the gear would be so soft as to wear rapidly and you would soon have a faulty structure.

Brown-Lipe Gear Co.
TRANSMISSIONS

Brown-Lipe-Chapin Co.
DIFFERENTIALS

SYRACUSE, N. Y.

NEW YORK
Thos. J. Wetzel, 29 W. 42d St.
CHICAGO
K. Franklin Peterson, 122 So. Michigan Ave.

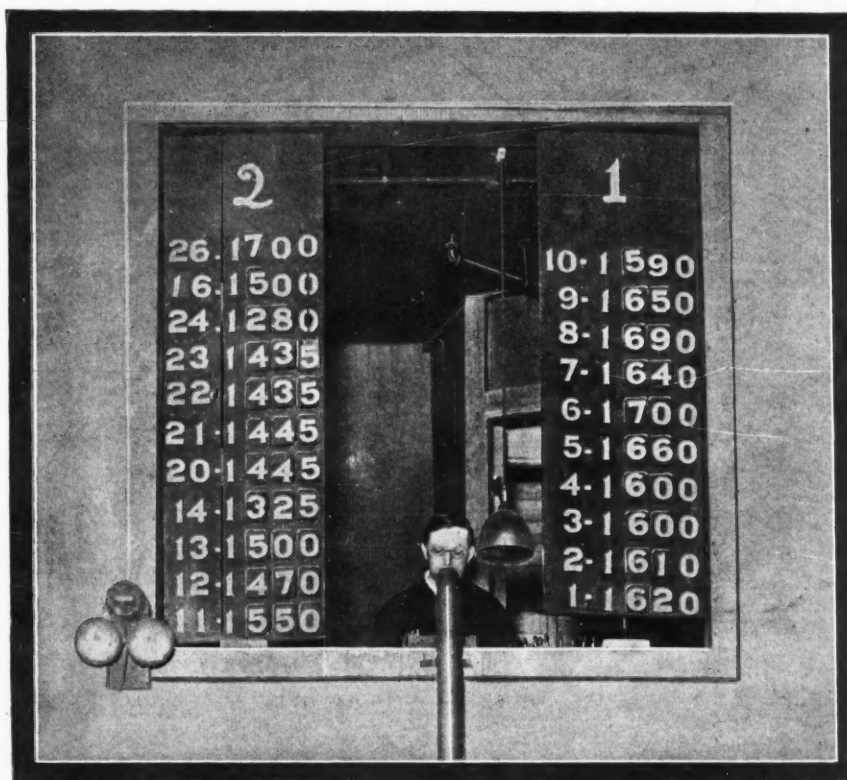
DETROIT
L. D. Bolton, 2215 Dime Savings Bank Bldg.
SAN FRANCISCO
A. H. Coates, 444 Market St.

Foreign Agent, Benjamin Whittaker, 2 Norfolk Street, Strand, London, W. C.

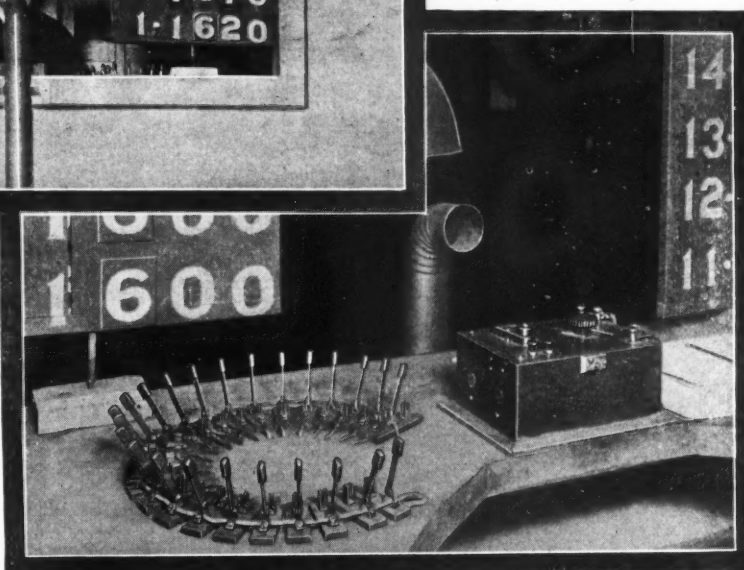
So, as stated above, it is essential that the surface of the gear to about 1-32 of an inch must be extremely hard while the balance of the gear must possess the characteristics of strength and toughness.

Years of research and actual experiment have developed certain methods and conditions in the heat treating process, that if followed carefully and accurately insure this result.

That Brown-Lipe practice does follow these methods and conditions carefully and accurately is clearly shown by the supremacy and dominance of Brown-Lipe products throughout the motor car industry.



The illustration herewith shows the pyrometer recording room in the Brown-Lipe heat treating department. It shows the operator at the speaking tube and on either side the charts giving the readings of the various furnaces. This operator makes five-minute checks of every furnace in the room, and it is his duty to see that the heat is brought from the low point to the high point regularly and steadily and that it is maintained at just exactly the right point during the specified time of the heat.



"Eurekamen"

*That's what
the old Greeks
used to say when
they made
a discovery—
"We Have
Found It!"*

LIKE most successful business men, we have thought and dreamt of business for years—tires, in particular.

Our thoughts and dreams have been—not only to produce an absolutely *complete* line of tires

—not only to put United States Tire dealers in a position to *meet competition*,

—but to march by it as if it were standing still.

Whether we found the secret in hard work or in inspiration, in the laboratory or in a dream—doesn't matter.

We Have Competition Beaten

We are not quite ready to tell you all about what has made it possible.

We will make the full announcement about the first week in January.

Wait for it—or at least wait for a talk with one of our salesmen.

One will be 'round to see *you* pretty soon.

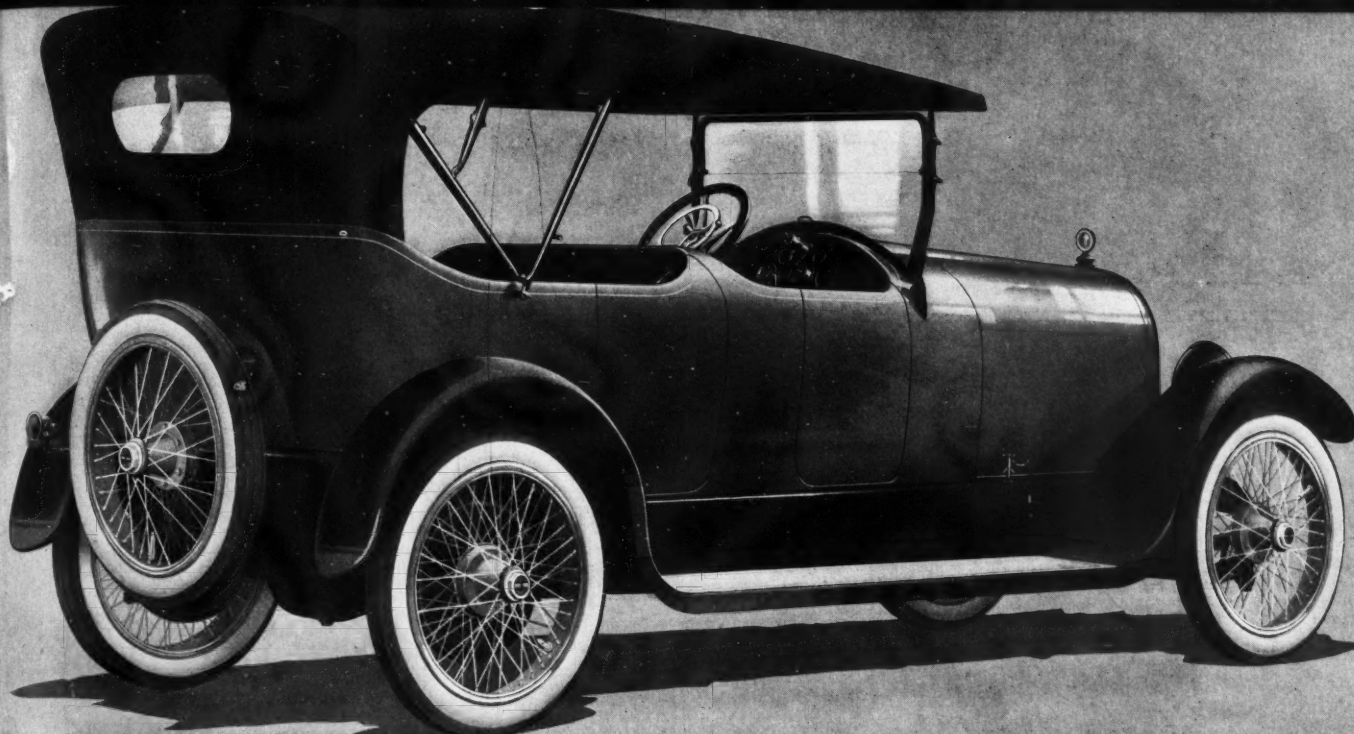
Of course rubber and fabric and other materials used in the manufacture of tires are steadily increasing in cost,—a condition that is causing all tire manufacturers some uneasiness regarding future prices. Despite this fact—

The wise dealer will not do anything radical until he has either seen our salesman or read our coming announcement.



United States Tire Company

New York City



A SCIENTIFICALLY CONSTRUCTED LIGHT WEIGHT CAR

What Weight Really Means

IN all claims of weight made for this new car, we have taken the actual weight of the first car built ready for the road, completely equipped, with all spares and accessories—all gasoline, oil, and water compartments filled. *Don't confuse this with so-called shipping weight.*

To fully realize what we have accomplished, you must picture the car—not as a small, weight-and-strength-skimped vehicle, but the magnificent 136-inch wheel-base, capable, luxurious, high-powered automobile of proven performance.

Compare the weight—3540 pounds ready for a journey—with the car's logical competitors—the few high-priced cars of its class.

To accomplish these results, we have been compelled to use aluminum and its alloys to an extent never before dreamed of. The body, fenders, hood, radiator shell, all pans and small parts usually made of sheet steel or castings, and in addition the water jackets of the engine together with the main structural parts, are all made of this wonderful light metal. The result is approximately 25 percent less weight plus greater strength.

See Details Next Page



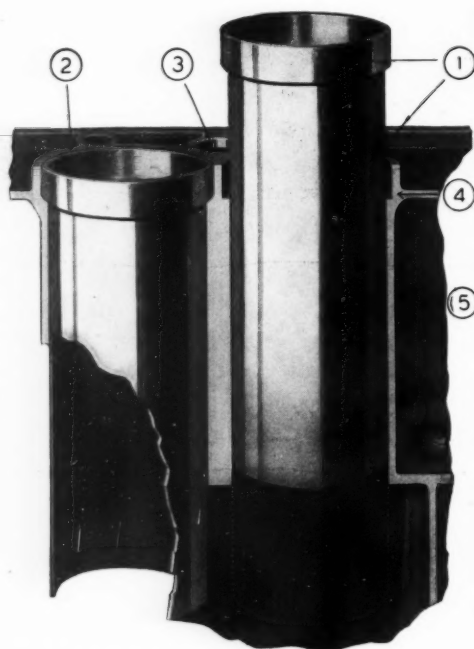


Borderland Trail, Douglass



Starvation Peak, N. M.

The Motor of the New Car



Cast Iron Sleeve Fitted into Aluminum Casting

IN keeping with the rest of the car, the motor departs from the conventional—lightness, rigidity, and power being the considerations of paramount importance. More aluminum is used than in ordinary design—the entire case and water jackets being of this material.

The motor is a novel overhead-valve design, utilizing a pressure-feed oiling system, supplemented by an overhead rocker-pivot oiling device, with an inter-connected throttle control which increases the oil supply as the throttle is opened.

We rate the motor as 34 horsepower—it actually developed 74 horsepower at 2450 R. P. M.

The motor is remarkable for its ability to deliver its rated horsepower with freedom from the small troubles usually developed in internal combustion motors. This is accomplished by an extreme simplicity in design. For example—there are only three gears in the entire motor—the water pump is direct-connected to the crank shaft—the reduction of parts in the motor is in keeping with the design of the entire car.

1—HARD CAST-IRON SLEEVE ACCURATELY GROUND INSIDE AND OUT.

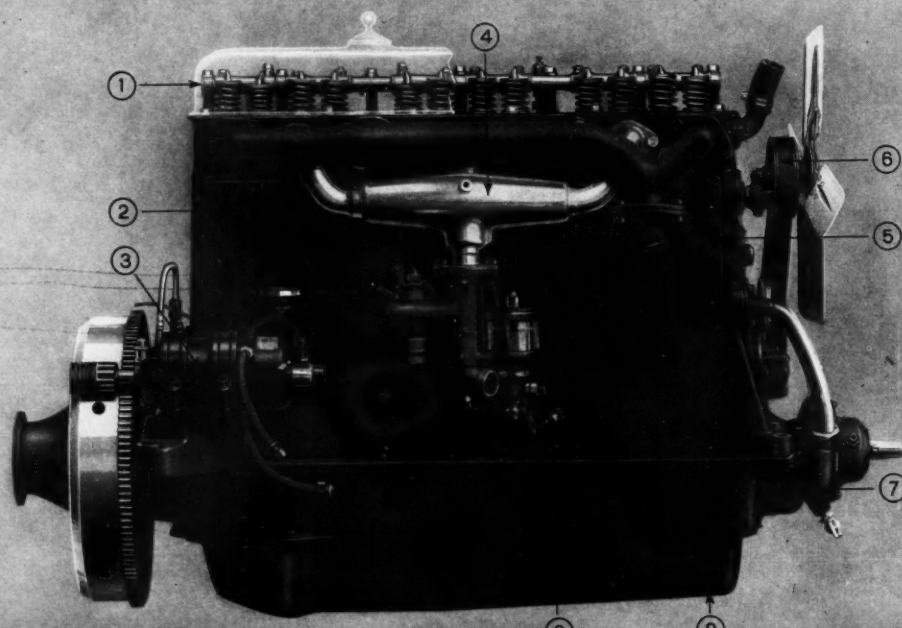
2—SLEEVE HELD IN PLACE BY CAST-IRON FIRING HEAD WHICH CONTAINS THE VALVES.

3—WATER CONNECTION TO FIRING HEAD.

4—ALUMINUM CRANK AND CYLINDER CASE.

5—WATER JACKET SPACE.

This is the fourth of a series of announcements which will appear each week regarding this extraordinary new car. Next week we will tell more of its remarkable qualities. For complete information, address—Manufacturers New Car, care Motor Age, 910 S. Michigan Ave., Chicago



1—ROCKER ARM PIVOT ACTING AS OVERHEAD OIL DISTRIBUTOR

2—SIDE PLATE

3—DIRECT ACTING ELECTRIC STARTER

4—WATER JACKETED INLET MANIFOLD

5—EXHAUST COMING OUT OF FRONT, MAKES COOL FLOOR BOARDS

6—NOTE LARGE FAN PULLEY

7—WATER PUMP NOT DRIVEN BY GEARS

8—NOTE THROTTLE LEVER CARRIED THROUGH MOTOR

9—RADIATING FINS—AIR COOLED OIL BASE



M

R. MOTORIST, here's Mr. Shine!

You'll be glad to know him.

He's a wonder. And wait till you see the Twelve Little Shine-ups!

They're a baker's dozen of the happiest, busiest, *deliver-the-goods* workers in the auto world.

We have a little to tell and much to sell! You have little to pay and much to say in praise of Mr. Shine and his Twelve Shine-ups—the *lucky thirteen*.

NEXT WEEK YOU'LL MEET 'EM ALL

A Boardwalk is Wood *and* Labor

Imagine, if you can, the constructor of the Boardwalk at Atlantic City reproducing a Cremona or a Stradivarius. And yet both the Boardwalk and the master violin are creations of wood and labor. Why only one Cremona—why only one Stradivarius? Broadly, because, combined with their physical capacity to fashion violins they possessed the inspired art that enabled them to make those wonderful instruments better than any other violin maker.

And the same controlling factors are responsible for the dominant quality in Sheldon springs. Sheldon springs possess greater virtue than any other springs because from the very beginning the Sheldon organization has possessed the *art* of spring making in superlative degree. And in this particular case it is the "art" that is the

SHELDON SPRINGS



Photo from Underwood & Underwood

THE SHELDON

Manufacturers
WILKES-BARRE



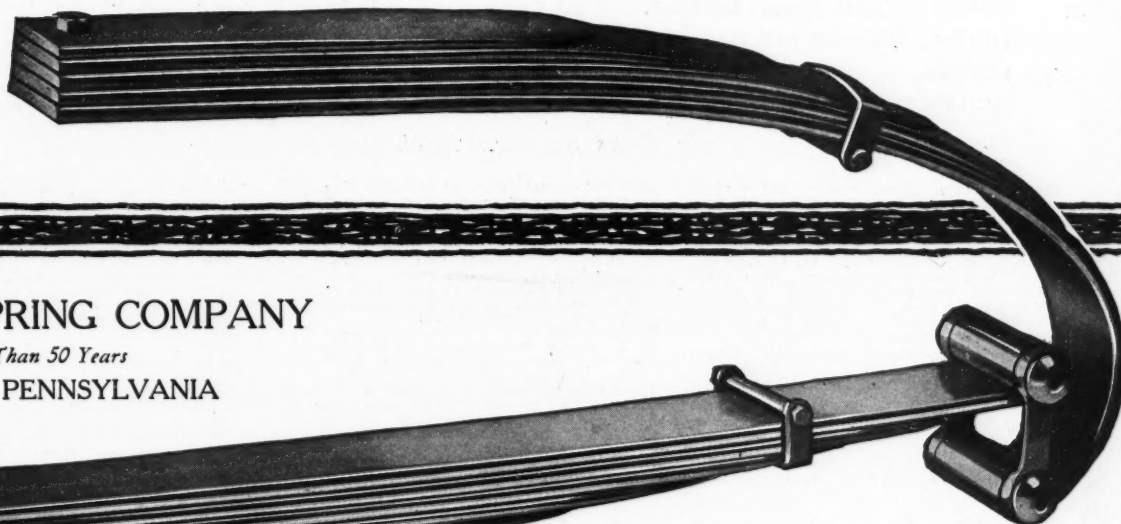
When Writing to Advertisers, Please Mention Motor Age

So is a Cremona Violin

deciding factor of quality—for *art* cannot be bought as can raw materials, machinery and manufacturing facilities. But with all the accepted superiority of Sheldon springs they are still commercially practical equipment for any car or truck no matter how low the selling price of that car or truck.

DON NGS

As a matter of fact Sheldon quality springs usually cost the manufacturer actually less money than any others. And of course Sheldon Springs are always guaranteed to show far greater length of life than any other springs that can be purchased.



AXLE AND SPRING COMPANY

of Springs and Axles for More Than 50 Years

PENNSYLVANIA

When Writing to Advertisers, Please Mention Motor Age

**Chain and Worm Drive**

Chain Drive		List
Model E. 2	-Ton.....	\$1900
" D. 3	-Ton.....	2400
Worm Drive		
Model H. 2	-Ton.....	\$2200
" J. 3½	-Ton.....	2850
" K. 5	-Ton.....	3800



America Needs 750,000 Trucks

HAVE you envied the truck dealer's commissions on war orders?

More permanent truck orders here in America are going begging.

An opportunity for much bigger commissions exists here at home—right now.

Conservative estimates show a demand for 750,000 trucks.

Don't envy the fortunes being made in European orders. You can make bigger ones in American orders.

American business is growing by

leaps and bounds—unheard of wealth is being coined—opportunities that never existed before are now within reach.

America needs and is buying U. S. Motor Trucks.

They are going to be bought right in your territory, whether you get the commission on them or not. Why not be the U. S. Truck dealer? At least get acquainted with our exceptional dealer's proposition. It is different from any other truck dealer's proposition you ever heard of. Not only different, but better.

It costs you nothing to learn what it is—so wire or write us today. Call us on long distance. Just as fast as business men know the many superior advantages of the U. S. trucks, they prefer them. U. S. Trucks are the easiest to sell. We can sell you—and if you know trucks you'll be more enthusiastic about the U. S. than any other.

Six Years Success. Established in 1909.

Floating Power Plant—Engine, drive shaft and transmission entirely independent of the main frame. U. S. Continental engine on rigid sub-frame supported between vanadium coil springs at forward end and by 5-inch ball and socket at rear, making perfect three point suspension. This saves wear and tear, prolongs life of engine and transmission gear, and delivers more power to drive wheels when frame is distorted. Very accessible and easily removed.

All vital parts protected against road shocks and vibration.

Gears are always in mesh in transmission case.

Hot air to assist vaporization of gasoline in U. S. Stromberg carburetor. Provides complete combustion, therefore more heat units and gasoline economy.

Engine speed controlled by sealed governor.

Ball and socket joints of steering gear provided with coil springs that automatically take up wear and prevent noise.

Rear wheels on worm drive rigidly keyed to axle drive shafts which extend to differential in center of axle, best suited to withstand side thrusts, etc.

Four brakes connected in pairs thru famous U. S. equalizer. Makes braking certain and effective and prevents skidding.

Right or left drive, with center control.

U. S. Special Transmission gear removable quickly from below without disturbing other parts.

Impossible to make change of gear while clutch is engaged. U. S. safety lock on lever set works automatically with release of clutch.

Adjustable foot pedals for long or short driver. Driver's Cab made entirely of sheet steel—better and lighter than wood.

Radiator is not supported by brackets or springs riveted and soldered to its side, but rests firmly in a special cradle or carrier which is fitted with double coil shock absorbing springs. This prevents leaky radiators.

No leaky gasoline tank because it is round with rounded ends of seamless steel tinned inside and out and held firmly by clamping straps of steel lined with anti-friction. No bolts or other fastenings attached to tanks.

Engine valves with their lifters and springs entirely enclosed. Dustproof and perfectly lubricated.

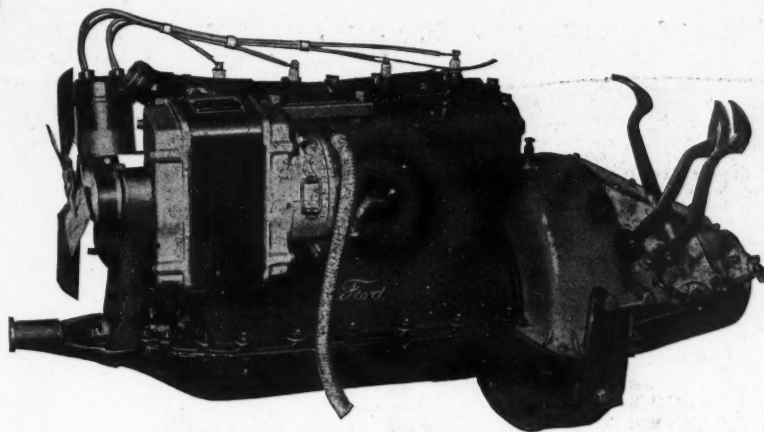
Engine bearing supplied with oil by means of two positive plunger pumps that pump oil constantly while engine is running.

Flexible steel hose gasoline pipe from tank to carburetor with no packing. Prevents gasoline leaks from vibration.

The United States Motor Truck Co., *Robert S. Stewart* **Cincinnati, O., U. S. A.**
General Manager

When Writing to Advertisers, Please Mention Motor Age

WESTINGHOUSE



Starting - Lighting - Ignition for Ford Cars

Have You Contracted?

We have commenced shipments of our Starting, Lighting, Ignition Equipment for Ford cars, free from the driving-chain and sprocket troubles heretofore generally experienced.

For several months we have directed our efforts in designing and testing, and manufacturing; we now have a large stock from which to make immediate shipments.

Our perfected equipment includes a silent chain of double previous chain strength, special compensating sprockets, and easily adjusted mounting brackets.

We are now represented by the following distributors and have an interesting proposition for well established, aggressive accessory houses in territories not assigned. Write us in advance and see us at our exhibit in the New York or Chicago Automobile Shows.

Atlanta, Ga., Ozburn Automobile Supply Co.
Baltimore, Md., The Richardson Garage.
Boston, Mass., Motor Parts Co.
Buffalo, N. Y., Motor Parts Co.
Chicago, Ill., Motor Car Supply Co.
Cleveland, O., The Auto Elec. Equipment Co.
Denver, Colo., Shaffer Auto Supply Co.
Kansas City, Mo., The Equipment Company.
Houston, Tex., Tel. Electric Co.
Minneapolis, Minn., Reinhard Brothers Co.

New Orleans, La., Shuler Rubber & Supply Co.
Oelwein, Iowa, Chas. W. Bopp.
Oklahoma City, Okla., Severin Tire & Supply Co.
Omaha, Neb., Powell Supply Co.
Philadelphia, Pa., Motor Parts Co.
Pittsburgh, Pa., Pittsburgh Auto Equipment Co.
Springfield, Mass., Motor Parts Co.
St. Louis, Mo., Phoenix Automobile Supply Co.
Washington, D. C., Record Auto Sup. & Service Co.
Wichita Falls, Tex., Western Auto Supply Co.



Westinghouse Electric & Manufacturing Co.
Automobile Equipment Department

Shadyside Works, Pittsburgh, Pa.



NEW AMERICAN CONVERTIBLE TOP *for* FORDS

The Greatest achievement in the history of top building



Two Tops for the Price of One
 — a weatherproof Limousine Top
 — a one-man Touring Top
 with Jiffy Curtains **\$55.**

Roadster \$45, f. o. b. Jackson

Here is the most comfortable, stylish, sensible "all-year" top yet built. It is light in weight and so neat, complete and graceful in appearance that you will want it at once.

Observe that it is not a so-called "detachable" top, but an *all-year* top. You put it on when you get it, and it stays on twelve months in the year. It is built exclusively for Fords by the world's largest top builders.

To change this top from a winter "Limousine" to a "one-man" touring top, you simply remove the glass sides and in thirty minutes you have a regular touring body with Jiffy curtains. It's simply great!

This American Convertible Top gives you all the comfort, luxury and refinement of a completely enclosed, absolutely weatherproof body.

And yet it is an "all-year" body. Practically two tops for the price of one.

Takes only about *two hours* to put on this light, stylish, American Convertible top—and once on, it is on to stay. It doesn't take an expert to do the work—you can do it yourself—we tell you how.

The glass sides are set in enameled steel frames; and heavy tape between glass and frames makes a noiseless, firm setting.

Doors open easily from the outside or inside. Cannot rattle because fitted with anti-rattle rubber inserts. Honestly, this top is a wonder for the money—only immediate big production makes its low price possible.

Daly & Company, Exclusive Sales Agents, 318 Hammond Bldg., Detroit, Mich.

When Writing to Advertisers, Please Mention Motor Age

NEW AMERICAN CONVERTIBLE TOP *for* FORDS

Built by the world's Largest exclusive Top makers



**Includes Glass Enclosed Top for Winter
One-man Touring Top with Jiffy Curtains
Rain-vision Ventilation Wind shield \$55.**

Roadster \$45, f. o. b. Jackson

The top material is highest grade, long grain, English effect artificial leather—better than real leather because it does not crack, always looks well, and is strictly weatherproof.

The American Convertible Top is light and strong, like the Ford. And it is durable and good looking. Yes, it's really classy.

It gives clear vision to all passengers. Sides are all clear glass. You can see "all ways."

The glass sides fasten rigidly to top with *cloth folds* on either side so they simply *cannot* rub, squeak or rattle. You will be pleased with the thoroughness and practical simplicity of construction.

Full directions, complete in every detail go with each top. Each top is shipped complete with rain

vision, ventilating windshield and cowl, ready to put in position in a few moments. And it is properly packed and crated.

We can give immediate shipment. Order at once. Send check, postal order, express order, or draft. Wire if you are in a hurry—but don't put off the enjoyment of solid winter comfort another day.

When you realize that this top is made exclusively by the American Top Company—you will understand that it is no experiment but a real marketable proposition, properly made with a big firm back of it.

Dealers and jobbers, write at once for details of this remarkable Sales *Certainty*. Don't wait. Get busy right away. Here is a sensible, practical improvement that every Ford owner wants at a price that beats them all.

Daly & Company, Exclusive Sales Agents, 318 Hammond Bldg., Detroit, Mich.

When Writing to Advertisers, Please Mention Motor Age

A Word of Precaution

to MOTOR AGE Readers

THE ANNUAL PLEASURE CAR SPECIFICATION NUMBER and NEW YORK SHOW FORECAST

will be issued Dec. 30th, 1915

In addition to containing a complete forecast of the New York Show, which opens January 1st, 1916, the December 30th issue will include *Descriptions* and *Specifications* of the 1916 *Pleasure Cars*.

In previous years the demand for copies of this special number has far exceeded the supply and, consequently, we have been unable to fill many orders received after the issue was printed.

To avoid disappointment for our friends and readers this year, we urge them to place their orders for copies, either with their news dealers or with the publishers, early enough so that sufficient copies may be printed to accommodate all.

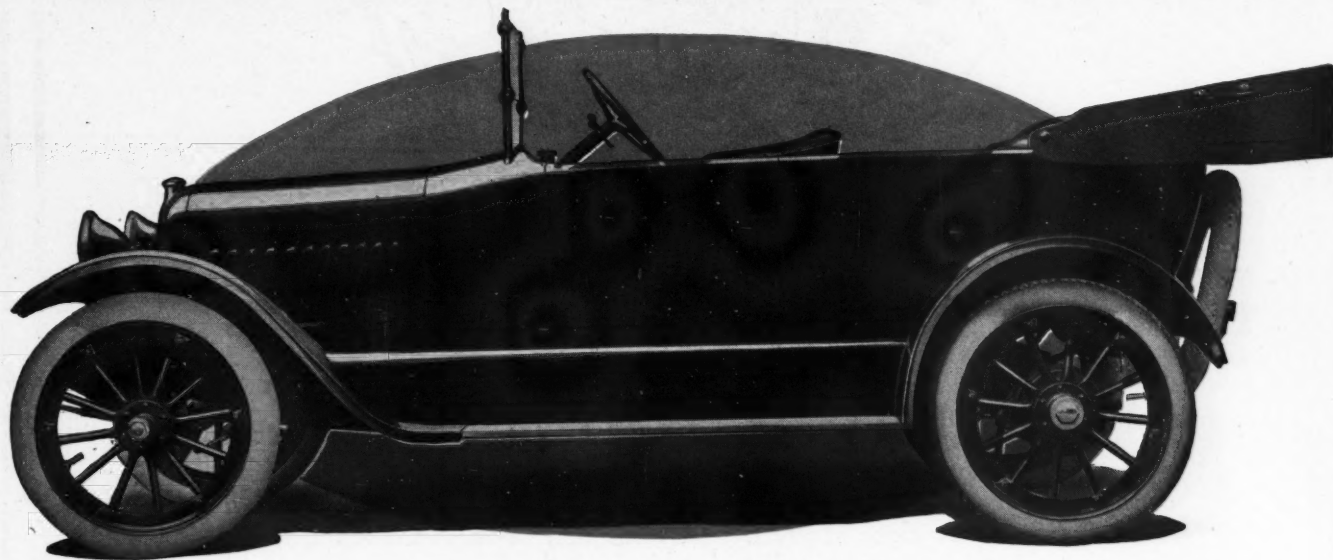
Of course it is not necessary for regular subscribers to do this, but if you are not on the MOTOR AGE subscription list it would be advisable to order your copy promptly to insure against being disappointed.

The price of this number is 25 cents. The date—December 30th, 1915.

MOTOR AGE

910 South Michigan Avenue
CHICAGO, ILLINOIS

GRANT SIX \$795



Men who formerly spent over a thousand dollars for sixes are now buying the Grant Six at \$795

Investigation shows that Grant Six buyers are largely drawn, not from these who are buying on ascending scale, but from the ranks of those who formerly drove larger, heavier, more expensive cars.

This is so because the Grant Six, with its remarkable, overhead valve motor and large, roomy body, affords every bit of luxury, every bit of power, all the comfort and ease of riding that were formerly exclusive with large cars, at a very substantial saving in first cost and after cost.

At last, men in all classes are looking upon the automobile not simply as a reflection of social prestige, but as a vehicle for transportation to be purchased upon the basis of efficiency. Ninety per cent of all buyers are purchasing cars of light weight.

Light weight in the car means a light draft on the pocketbook. It means longer life to the car, longer life for the tires, lower cost per mile of travel.

Moreover, there is that item of depreciation—a big item in the cost of a heavy car—a wonderfully small item in the cost of the Grant Six.

Look at these facts; then draw your own conclusions:

Grant Six has a wheel base of 112 inches, not too long nor too short. It has a big, fine passenger body. The body lines are beautiful; the upholstery is soft and deep; the springs are wonderfully easy riding; the motor is amazingly quiet and flexible. It is a "six" with all that "six" means in perfect balance and freedom from vibration.

Grant Six throttles down to 1½ miles an hour; speeds up to fifty miles. Goes twenty miles and more to the gallon of gasoline (many owners average twenty-eight miles); goes 900 miles to the gallon of oil, and will climb any hill, go through any sand; and the Grant Six gives you everything you can desire in equipment, down to the last detail.

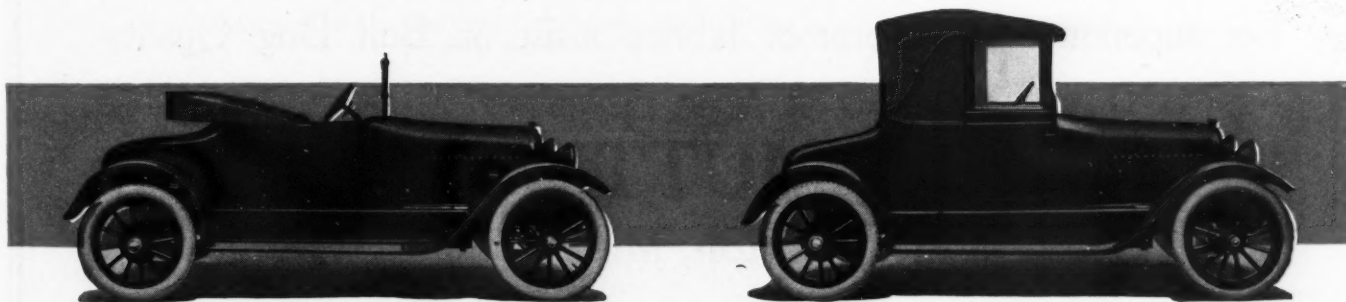
Buy upon the basis of what the car is, what it will do, what it costs, and what it will yield for that cost and you will surely buy a Grant Six.

We build one chassis only, but you may choose from three bodies: Five passenger touring car, \$795; three passenger roadster, \$795; three passenger cabriolet, \$1025.

Cabriolet and roadster mounted on special roadster springs.

See any Grant dealer or write at once to us for complete literature.

GRANT MOTOR COMPANY, Findlay, Ohio



When Writing to Advertisers, Please Mention Motor Age



Mutty's Special Auto Rubber Cloths

Our Auto Rubber Cloths are the result of years and years of close study of the demands of the trade, and the results are evident by the hundreds of manufacturers who use these Cloths on the tops of hundreds of thousands of automobiles. They are made in several grades, including BULL DOG QUALITY.


Mutty's Special Auto Leathers

This line comprises a large variety of patterns and finishes; is extremely pliable, easy to work and gives an extraordinary amount of wear. It is made in several grades, including BULL DOG QUALITY.

Mutty's Mohairs and Serges Are Waterproof and Sunproof

For superiority in waterproof fabrics insist on Bull Dog Quality

L. J. MUTTY CO.
Boston, Mass.



Announcing

National REDWALL
5000 Mile
TIRES

**All Types and Sizes
Immediate Delivery
Guaranteed for
5000 Miles**

PLAIN TREAD **NON-SKID**

**A Tire of Superior Design, Construction, Material,
Workmanship and Supervision**

DEALERS—Exclusive REDWALL 5000-Mile Tire territory is a valuable asset. Perhaps you can close for it. Write for our territorial proposition on tires, tubes and rubber supplies.

NATIONAL RUBBER COMPANY
POTTSTOWN PENNSYLVANIA

Distributors

Lake Charles Auto & Supply Co., Lake Charles, La.	Graves-Humphreys Hdw. Co., Roanoke, Va.	Tennison Bros., Dallas, Texas	Marshall Oil Co., Marshalltown, Iowa	Marshall Oil Co., Kansas City, Mo.
J. M. Shock Absorber & Auto Spec. Co., Pittsburgh, Pa.	Marshall Oil Co., Minneapolis, Minn.	J. M. Shock Absorber Co., New York City	Koochook Rubber Co., St. Louis, Mo.	
J. M. Shock Absorber Co., Philadelphia, Pa.	Electric Appliance Co., San Francisco, Cal.	C. A. Carlson, 700 Main, Buffalo, N. Y.	Single Centre Buggy Co., Evansville, Ind.	

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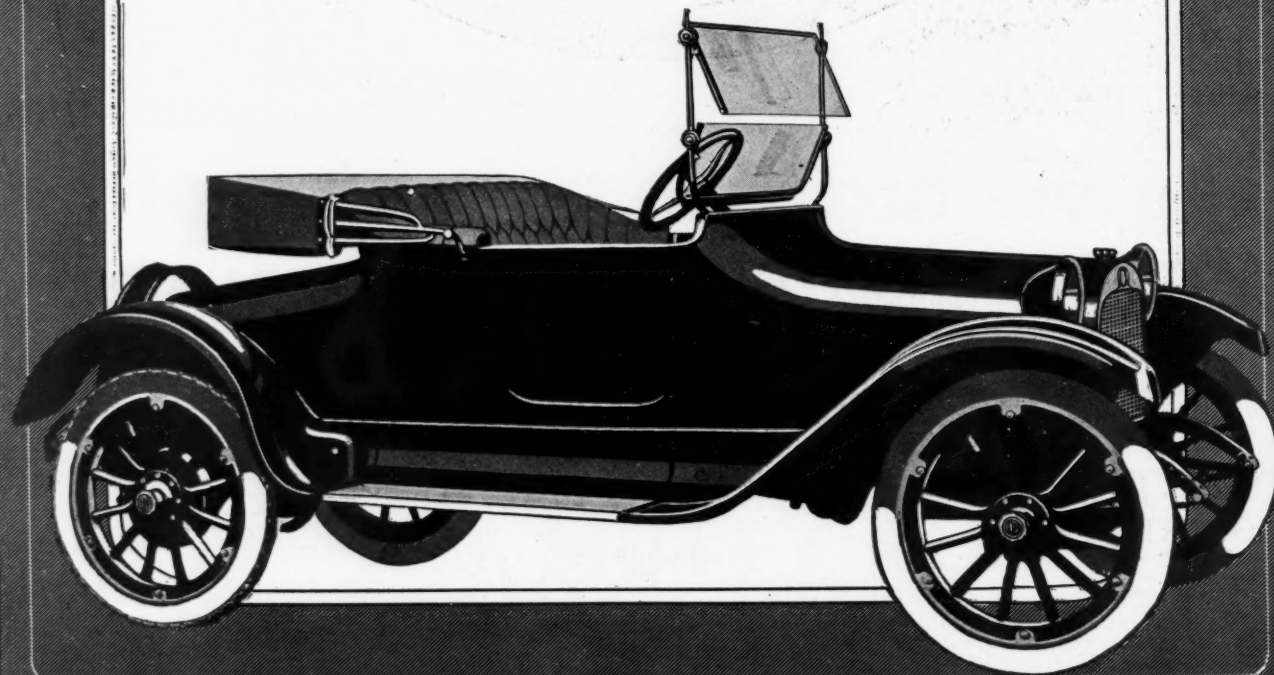
DODGE BROTHERS ROADSTER

How thoroughly pleasing it is you will best appreciate by trying to find some one detail you would care to have changed.

The lines of the car are striking, and the enameled finish holds its lustre for a long period. There is just the right depth, just the right width and just the right tilt to the seats. Everything you have to touch with hand or foot is within easy reach. The compartment at the rear is exceptionally spacious.

The gasoline consumption is unusually low
The price of the Touring Car or Roadster complete
is \$785 (f. o. b. Detroit)
Canadian price \$1100 (add freight from Detroit)

DODGE BROTHERS, DETROIT



Only Successful Dealers Sell *Stewart* Products

DEALERS who try to sell you lesser known, or untried, wrong-principle speedometers are up against the hardest kind of a proposition.

Every FORD Owner prefers the Stewart Magnetic Type Speedometer, used by over 1,700,000 car owners and regular equipment by 95 per cent of all car manufacturers.

Successful Dealers *offer* you the Stewart Magnetic Type Speedometer.

They could handle others, but won't risk dissatisfying their customers.

Their reputation won't permit it.

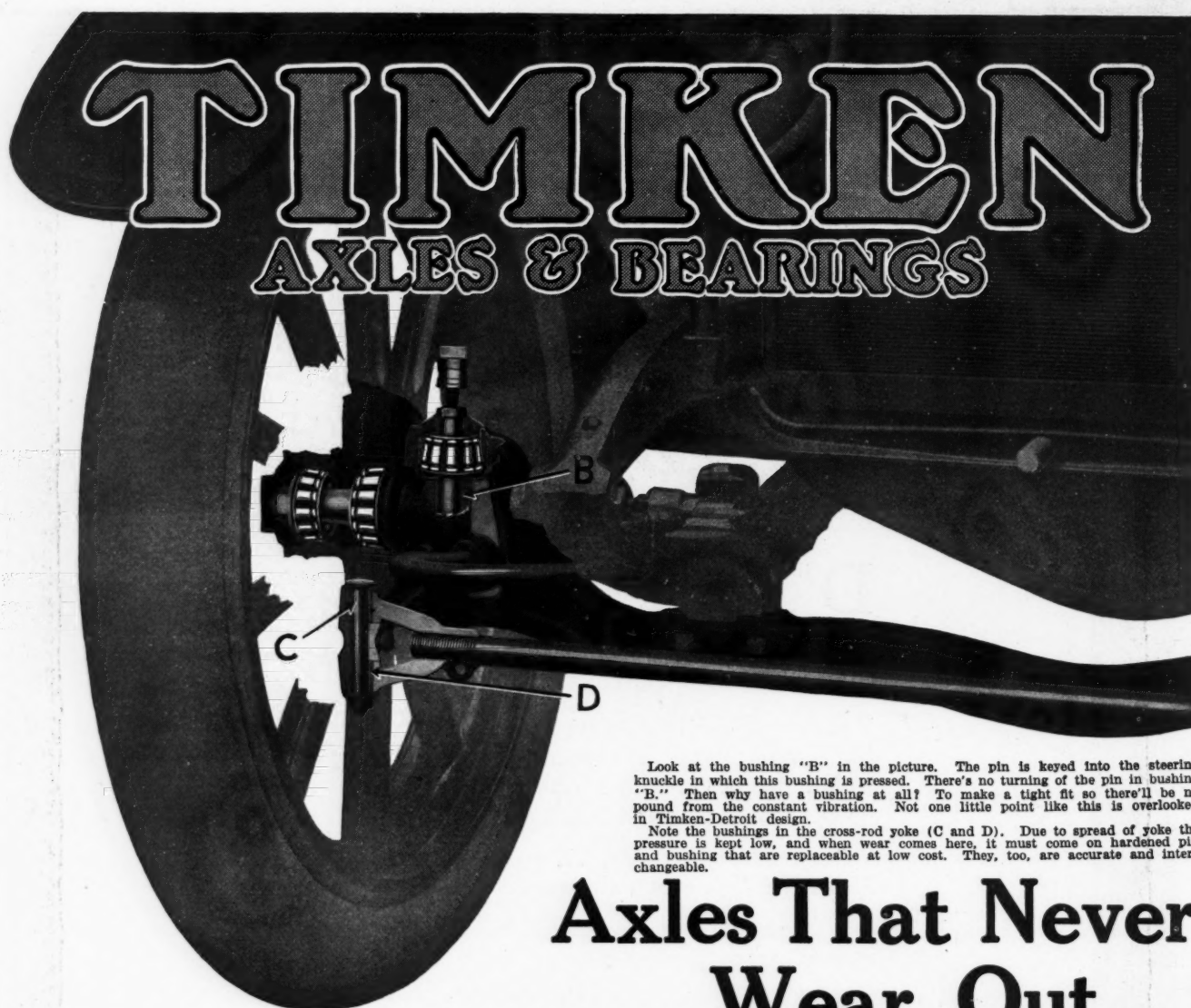
They offer you Stewart Products which will please you and bring you back for other supplies that they carry.

Successful Dealers want to make regular, permanent and satisfied customers. They take no chances. Why should you?

Stewart Speedometer
MAGNETIC TYPE
for FORD Cars - \$12



Stewart-Warner Speedometer Corporation, Chicago, U. S. A.



Look at the bushing "B" in the picture. The pin is keyed into the steering knuckle in which this bushing is pressed. There's no turning of the pin in bushing "B." Then why have a bushing at all? To make a tight fit so there'll be no pound from the constant vibration. Not one little point like this is overlooked in Timken-Detroit design.

Note the bushings in the cross-rod yoke (C and D). Due to spread of yoke the pressure is kept low, and when wear comes here, it must come on hardened pin and bushing that are replaceable at low cost. They, too, are accurate and interchangeable.

Axles That Never Wear Out

MOVING parts of axles, like moving parts of anything, will wear in time. There is no exception to this rule, but—

In the Timken-Detroit Front Axle the moving parts—every one of them—are either Timken Roller Bearings or hardened and ground steel bushings or pins.

These bearings, bushings, and pins wear very slowly. Timken Bearings are adjustable to take up the slight wear and Timken-Detroit Bushings and Pins are easily replaceable when worn sufficiently.

So the axle may truly be said to never wear out.

Take the front axle spindle. No wear comes on it because nothing moves on it. Slight wear does come on the cones, cups and rollers of the two bearings. These are Timken Tapered Roller Bearings that offer greatest resistance to wear and are adjustable to offset the effects of wear when it comes.

The same thing is true of the steering knuckle pin. At the top, to sustain the great weight, is a Timken

bearing. Below, where pressure is less but where there is some motion, there's a hardened steel bushing. It is made of good steel, is heat-treated, hardened and ground to size so it wears very slowly.

And when it does wear it can be replaced easily, quickly and cheaply. Because Timken Bushings are accurate to the thousandth part of an inch, they are interchangeable. A new one will fit without any tinkering.

Of course, Timken-Detroit Axles are strong enough, and to spare, for the loads they are designed to carry. And for the emergencies of motor-truck and pleasure car service. They are standing up under thousands of commercial and pleasure cars made by the leading builders.

When every other part of those cars is worn out, new pins, new bushings, perhaps a new bearing here and there will fit them for another lifetime of service under another car.

A 72-page booklet No. T-9, "The Anatomy of Automobile Axles," tells the story of the axle in an interesting, human way. A 32-page booklet No. T-10, "The Care and Character of Bearings," gives clear, non-technical information of great value to the car owner. These, with the list of "The Companies Timken Keeps" will be mailed free on request for the three booklets to either Timken Company. Only the booklets will be sent, no letters, no salesman.



THE TIMKEN-DETROIT AXLE COMPANY
Detroit, Michigan

THE TIMKEN ROLLER BEARING COMPANY
Canton, Ohio

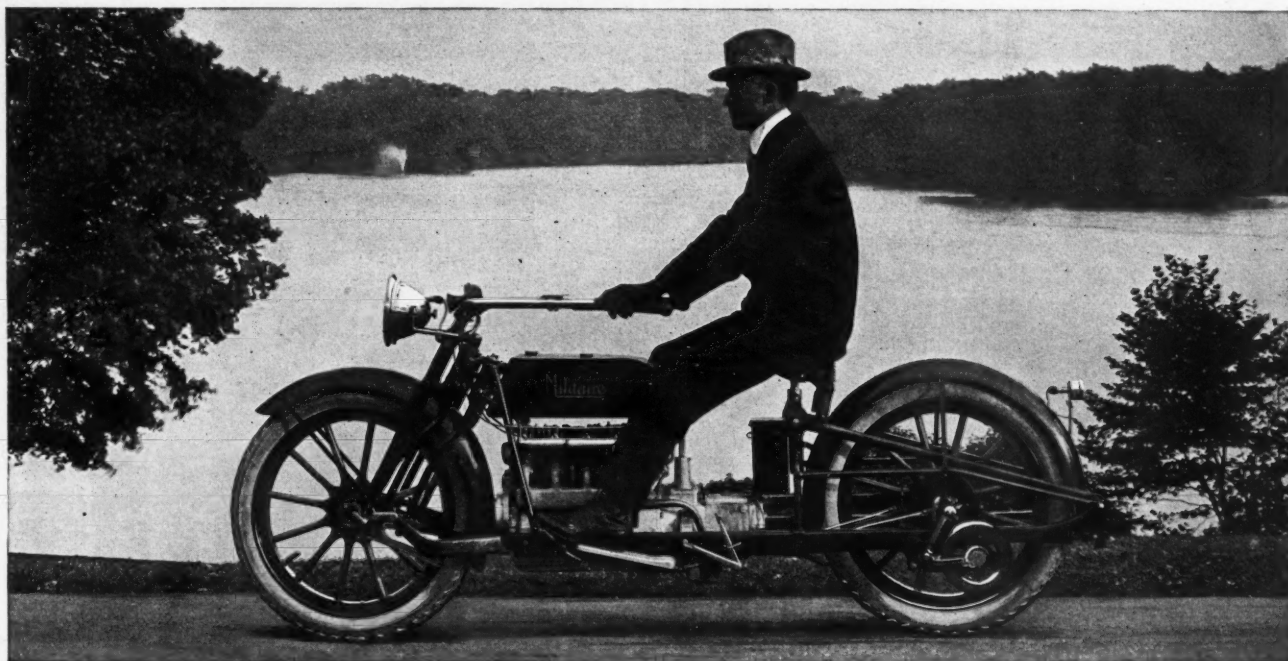


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"Patented Pivoted
Front Axle"

"4-Cylinder Motor"

"3 Speeds Forward
1 Reverse"



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Suspension"

"Channel Steel
Frame"

"Unit Power
Plant"

"Shaft Drive"
"Idler Wheels"

The 2-Wheeled Automobile

For those who drive a large car yet desire a light, dignified vehicle for convenience and economy in getting about; for city and country salesman, for physicians; for military and police service, and for commercial purposes. Constructed and designed by automobile engineers. Starts instantly from a standstill, without pedaling or touching feet to ground. No mud or grease from a chain drive. Wonderfully silent, vibrationless motor.

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Combines all the advantages of automobile construction with the unequalled economy of motorcycle upkeep. 40 to 60 miles per gallon of gasoline. Tire upkeep but one-fourth that of lightest automobile. Garge rental negligible. Offers the latest approved principles of motor car construction: **Channel steel frame**, as opposed to impractical diamond or V-shaped motorcycle frames which result in mechanical complication, heavy construction and improper balance.

Pivoted Front Axle, making possible for the first time the adoption of an underslung frame and the use of automobile construction throughout. Eliminates impractical carriage of transmission on rear axle and provides for shaft drive. Permits equal distribution of weight and insures very low center of gravity and perfect balance. Enables operator to turn sharp corners without leaning or shifting of weight.

Specifications: None but units which have become standardized in motor car construction. No experimental features—but everything of highest quality.

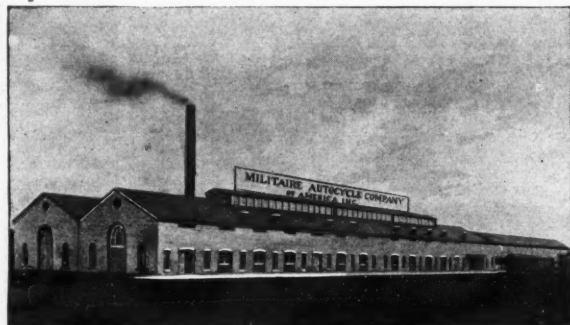
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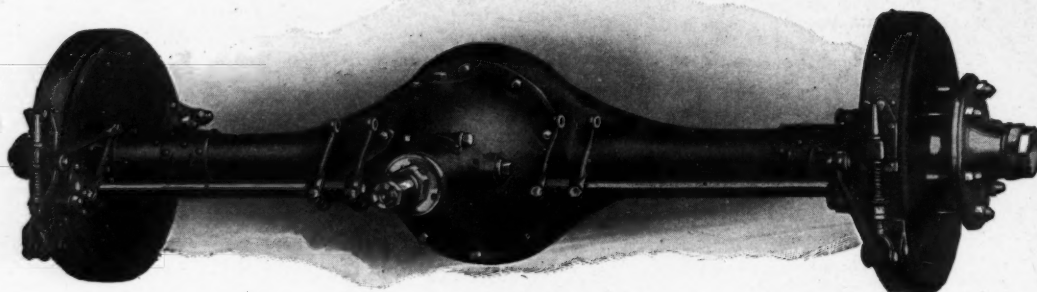
Militaire Autocycle Co.

(of America)

BUFFALO, N. Y.



PLANT, KENSINGTON AVENUE



COLUMBIA AXLES

COLUMBIA REAR AXLE construction allows for either the Hotchkiss type of drive (in which the driving strains are taken through the rear springs) or the rigid type (in which the driving strains are taken care of with torque arms).

If it is desired to take the strains through the rear springs the spring seats are riveted.

If it is desired to take the strains with torque arms, the axles will be supplied with torque arm bosses and oscillating spring seats.

In either case the same general features of construction will be found—Three Quarter Floating Construction; Spiral Bevel Gears; Taper Roller Bearings; Internal and External Wrapping Type Brakes; Pressed Steel Housing, continuous from hub to hub.

COLUMBIA FRONT AXLES are I-Beam forgings, heat treated, with thrust bearings in the yokes to insure easy steering.

THE COLUMBIA AXLE COMPANY

Cleveland

826 East 72nd St.

Ohio

Manufacturers also of Torbensen Internal Gear Driven Axles





**Marking an epoch in
motor car history—**

The
**Jeffery
Sedan**

**A Remarkably *Different*
Closed Coach**

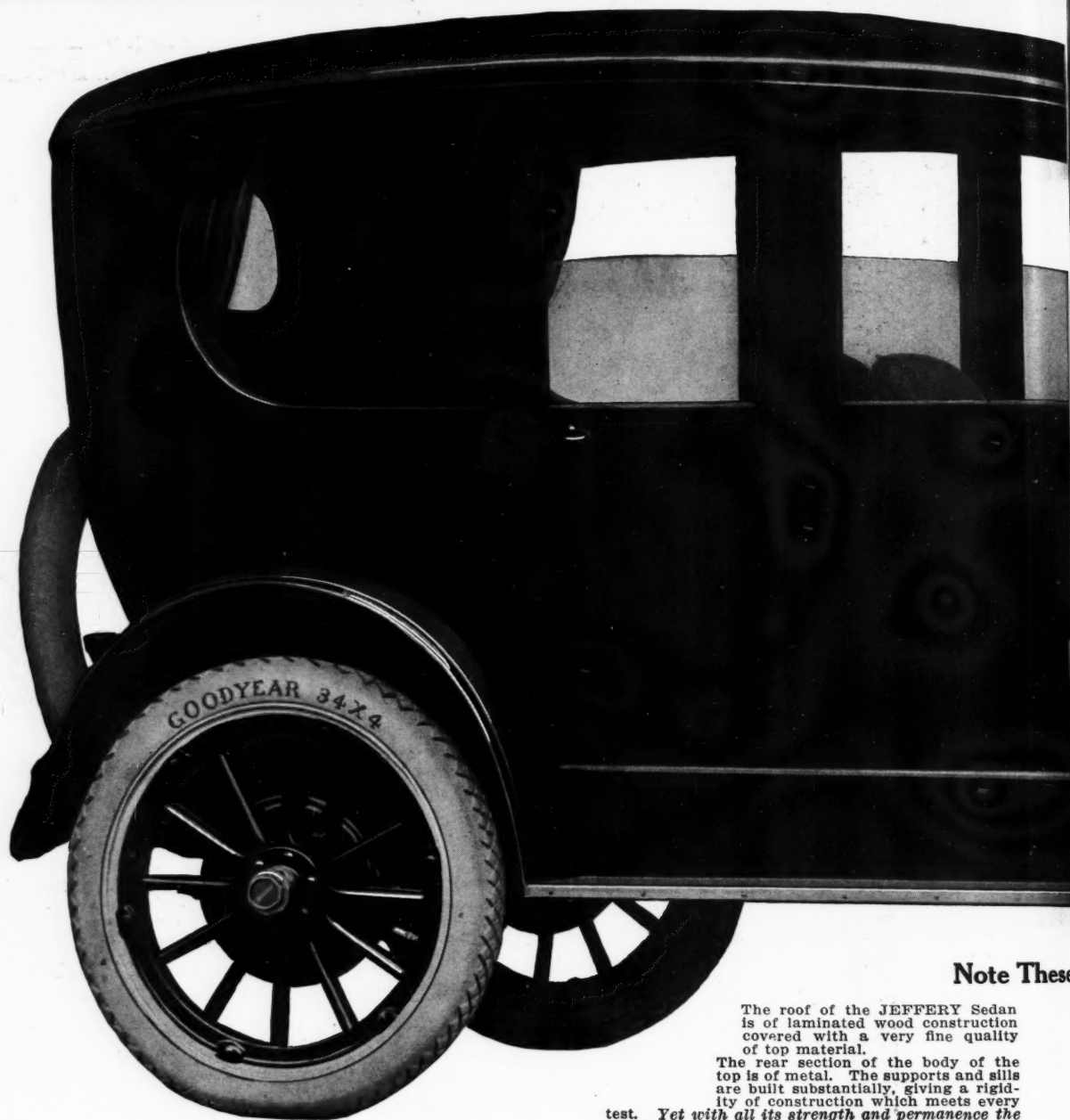
A *new* type of all-purpose motor car—peculiarly adapted to American motoring conditions. Virtually two cars in one—a dignified, handsomely appointed Sedan for winter—a big, roomy touring car for the rest of the year—all included in a *single* price—\$1165. Only \$165 above the price of the JEFFERY Touring Car.

Each top is a JEFFERY top tailored in the JEFFERY plant expressly for the particular body it adorns—thus safeguarding the owner against squeaking, loosening or rattling. Furthermore, the disagreeable “rumble” usually associated with closed cars has been eliminated by the JEFFERY construction.

A close inspection fails to reveal the fact that the top is removable—yet it *is*.

In short, the JEFFERY Sedan is a *custom-built* enclosed coach—designed and built from the ground up at the JEFFERY factory.

*The first satisfactory
economical solution of the
Winter-Summer car problem*



Note These Spec

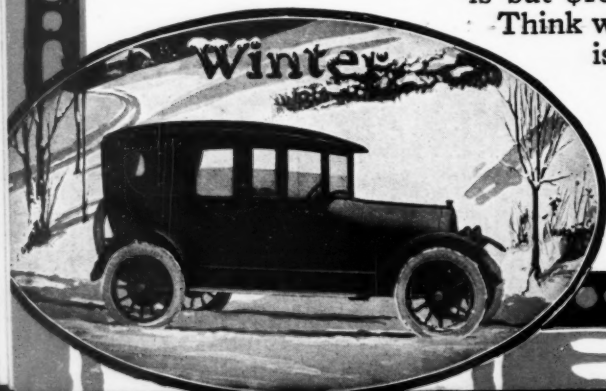
The roof of the JEFFERY Sedan is of laminated wood construction covered with a very fine quality of top material. The rear section of the body of the top is of metal. The supports and sills are built substantially, giving a rigidity of construction which meets every test. Yet with all its strength and permanence the weight of the top is but approximately 200 pounds.

Breaking Down *the* Cost Barrier to

Luxury That Formerly Cost \$2,000 to \$5,000

Before the JEFFERY Sedan, closed cars were a luxury costing anywhere from \$2,000 to \$5,000.

Now anyone who can afford a good touring car can afford the JEFFERY Sedan. The price is but \$165 more than that of the JEFFERY Four with touring top. Think what that means. For only \$165 extra every closed car comfort is yours—protection from wind, sleet, snow, rain—handsomely upholstered interior—drop type ventilating plate glass windows—latest style portiere type window curtains—electric dome lighting and innumerable other details formerly associated only with closed cars selling at several times its price.



The Jeffery Sedan

\$1165

*Enclosed Top Removable—
Summer Top Included*



Special Features

Taking into consideration the summer top, it will be seen that the additional weight is but a trifle over 100 pounds—assuring economy of operation and comfort on country roads. The windows are of 3-16 inch crystal plate, ground and polished. In the two broad forward windows and in the doors the glass is arranged to drop half way, affording ample ventilation. The illumination of the interior is provided by an electric dome placed in accordance with the latest enclosed car practice.

to Closed Car Luxury " "

A Demand That Cannot Possibly Be Filled

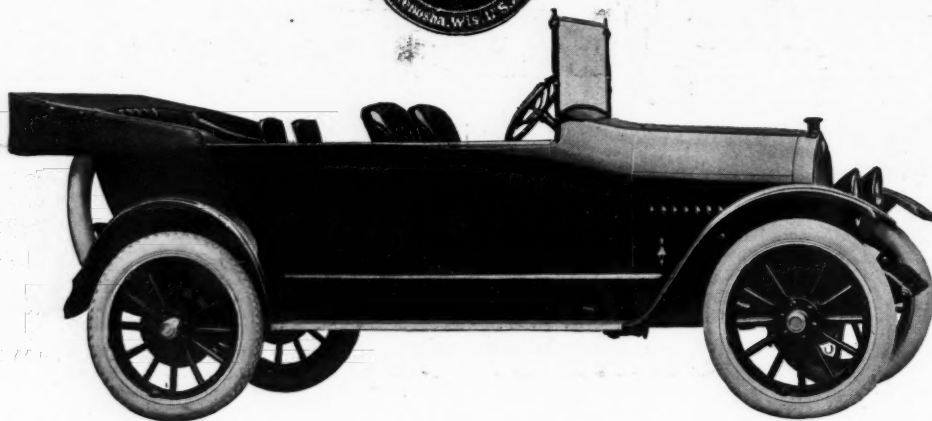
Is it to be wondered then the JEFFERY Sedan has taken the country by storm—that JEFFERY dealers are burning up the wires for more cars—that JEFFERY buyers are clamoring for rush deliveries? Never has an idea met with more instant and enthusiastic acceptance. For years car owners have looked forward to just such an all-year, all-service car at a reasonable price. Now they have it.

The result is that the Jeffery factory, in spite of greatly increased facilities, will be unable to keep up with the constantly increasing flood of orders. Every indication points to the fact that this car is doing away with the "seasonable" feature of the closed car business. The demand is evidently going to continue through the entire winter and spring.

Consequently, experienced dealers are safeguarding themselves now against a shortage of Jeffery Sedans next spring. Call on the JEFFERY dealer today, or wire us to insure prompt delivery.

Details of construction and interior finish on next page.





- and when summer comes



Illustrating the roominess and comfort of the rear compartment. The upholstery is grey whipcord—leather seats optional. The window curtains—portiere type.

or in the spring at the first "call of the road," it is a simple matter to remove the Sedan top—giving you an open touring car illustrated above complete with summer top—at **no extra cost**.

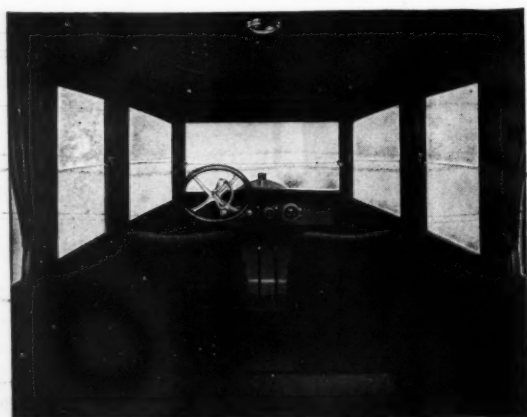
Order your JEFFERY Sedan now—before you suffer the chilly discomforts of driving an open car throughout another winter, or enduring the stuffy inconvenience of driving a permanently closed car during the stifling heat of another summer.

Dealers

JEFFERY Sedans are selling **now**. Winter is their harvest season—exactly when nine out of every ten car owners want and need a closed car most.

The wonderful value and exclusive features of the JEFFERY Sedan appeal to this trade which ordinarily delays purchasing till spring.

The JEFFERY Sedan will make your winter business show a handsome profit.



Divided front seats afford easy access from the rear to the front compartment. By adopting this advanced design we have done away with fore doors, thereby providing wider windows, a broader vision and longer unbroken body lines.

Orders must be placed immediately to insure early deliveries. Write or wire us

The Jeffery Four Touring Car
Standard Seven Passenger..... \$1035
Without Auxiliary Seats..... \$1000

The Jeffery Four, three-passenger Roadster... \$1000

The Jeffery Sedan
Five Passenger..... \$1165
Seven Passenger..... \$1200

The Jeffery Quad—the truck that drives, brakes and steers on all four wheels.....\$2750

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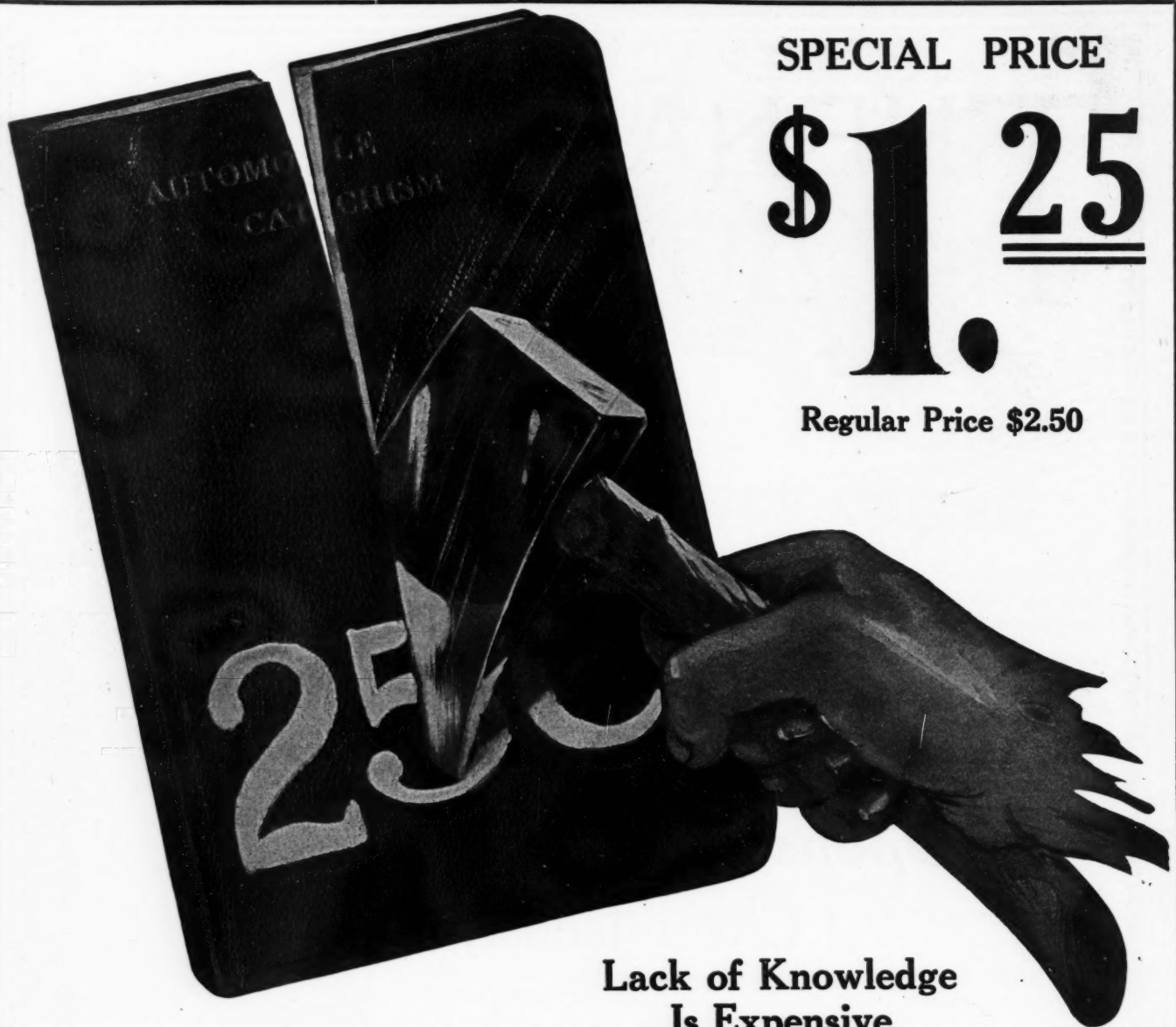
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Did you realize on them the amount of net profit to which your investment and Good Service entitled you?

Were you protected from the cut-price competition of Tom—Dick—and Harry on the same **Tires**, but without the same **Service**?

Did the Tires You Sold advance your business reputation, and help build trade the past season—as well as insure a better business for the future?

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MARATHON

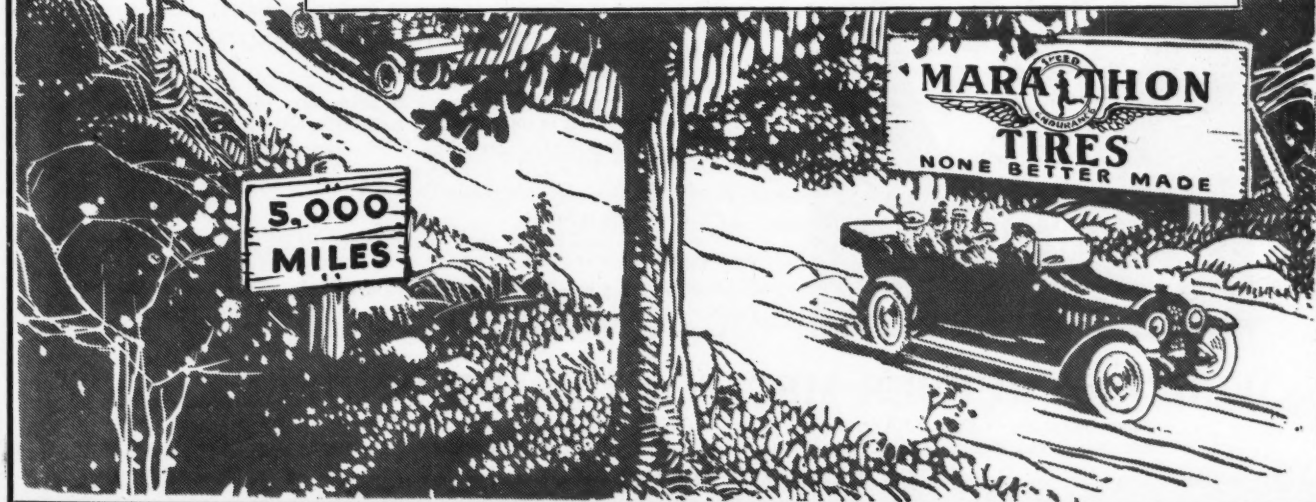
**Whip-Cord and Fabric Tires with
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Marathon Tires are built to meet the Demand for Quality—Not the Competition of Price.

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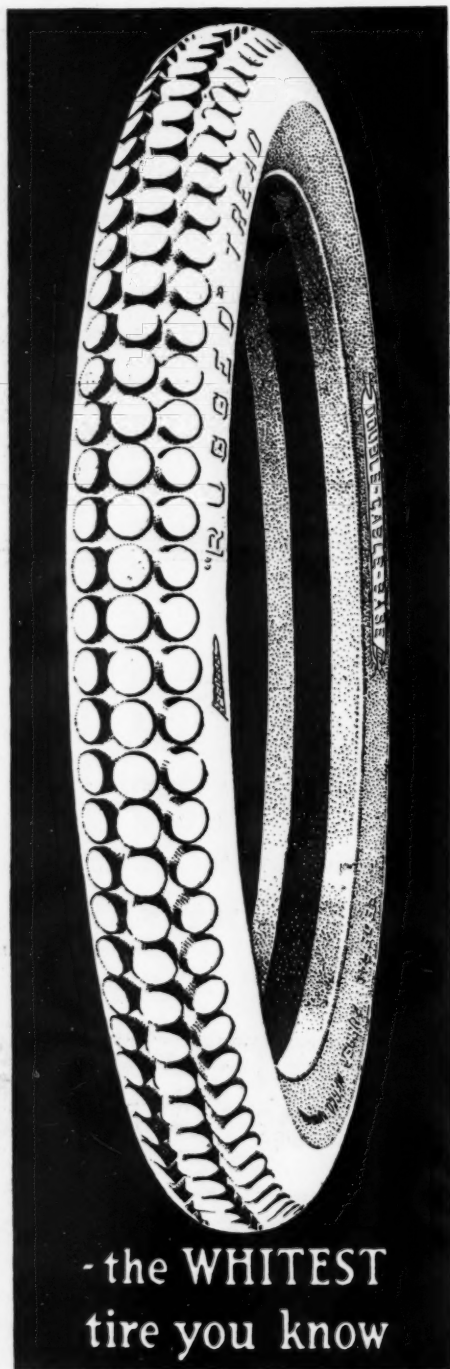
Write for the Marathon Proposition—NOW!

**The Marathon Tire & Rubber Co.
Cuyahoga Falls, Ohio**



Why Federal Tires Sell So Easily

The Dealer Sells a Habit as Well as a Tire —



IT'S an easy matter for the dealer to sell an automobile tire that is *known* to all users to give good service—that is a good “repeater.”

Car owners and drivers generally, have had so much tire trouble that a tire that every one admits gives long and satisfactory service under every road condition almost sells itself.

Men have learned that they must ride *on the tire itself*, instead of on a mileage-guarantee or a glowing advertisement.

Men have learned that most of their tire troubles are *close to the rim*—where the fabric meets the greatest strain and gives way the quickest—in the Usual Tire.

Nothing like this can happen in

FEDERAL

Double-Cable-Base

TIRES

The FEDERAL tire is kept in its place and kept at its work with strong double-cables, each cable being made of five strands of specially-made, specially tested steel wire. These staunch cables are imbedded in a *soft* bead filler. This filler has a *soft* top-edge which goes *with* the fabric every-which-way, instead of standing up stiffly against it and cutting it. When a FEDERAL-made tire finally does wear out, *it wears out altogether*.

THIS IS THE BIGGEST IMPROVEMENT EVER MADE IN BUILDING A TIRE.

It is the one sensible and practical assurance to the *user* of the tire that FEDERAL is only another name for Extra Service.

Whenever the dealer takes the 5 minutes necessary to explain this *exclusive* FEDERAL advantage to the Usual Tire user—he sells a FEDERAL Double-Cable-Base tire.

He also sells a habit.

For no car-owner will again ever trade FEDERAL service for anything else.

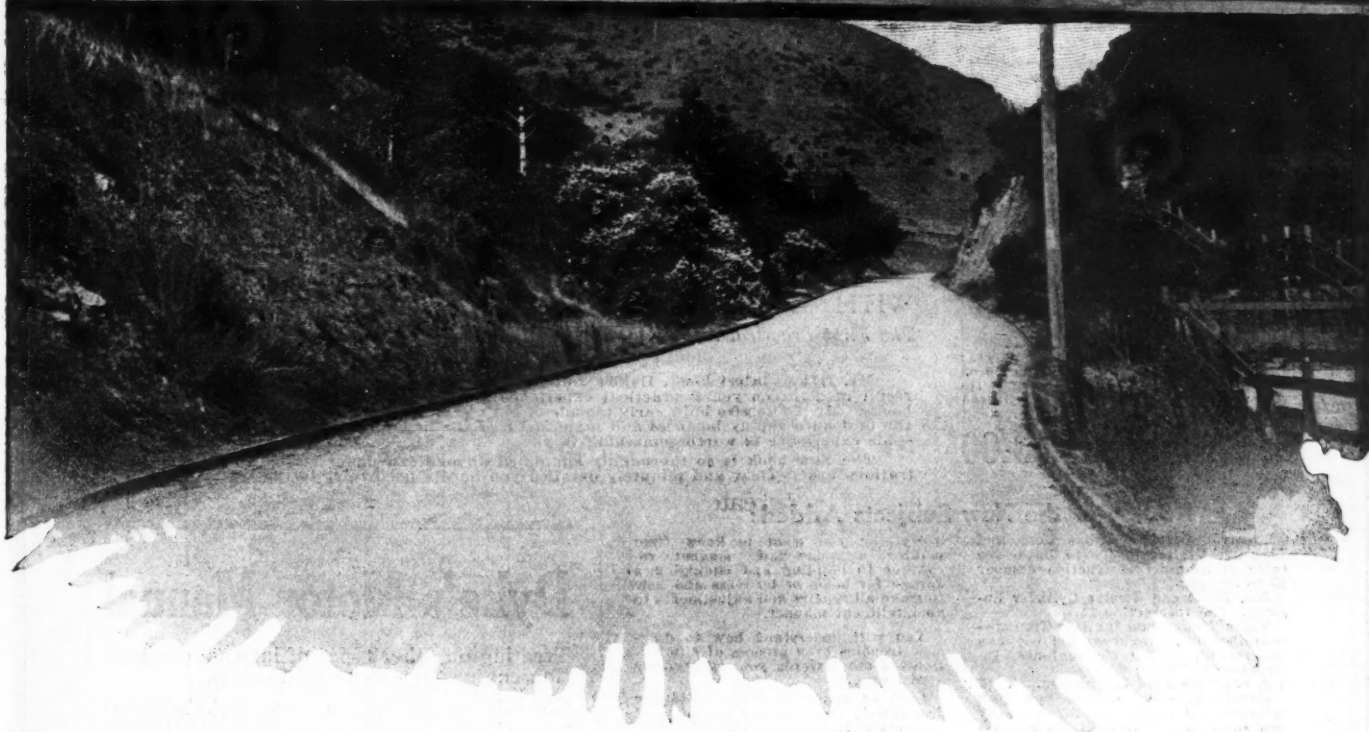
And *that* is why FEDERAL dealers are making good and quick money—why the FEDERAL business is the fastest-growing one of its kind—why the FEDERAL is “the WHITEST Tire you know!”

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Manufacturers of Federal Automobile Tires, Tubes and Auto Tire Sundries, Motorcycle, Bicycle and Carriage Tires, Rubber Heels, Horse Shoe Pads, Rubber Matting and general mechanical rubber goods.

FEDERAL “The Sterling Mark on Rubber”

The Road Ahead



What if the road ahead does not always follow the valleys—
 What if you find yourself at the foot of a long stretch of upgrade—
 What if such a hill looms up in front of you just around the bend—
 What if it begins abruptly with no chance to run at it—
 What if the most adverse set of circumstances you have met in many a
 day's drive be ahead—if your car is equipped with

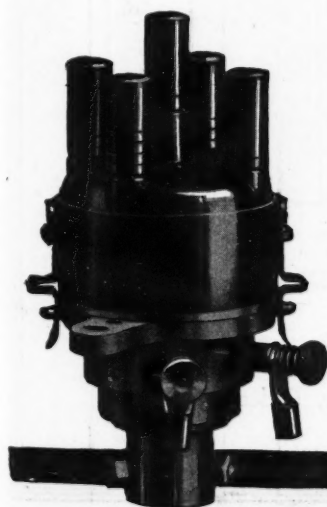
AUTOMATIC · IGNITION CONNECTICUT

it will take you up and over as smoothly and as surely as you could ask to go.

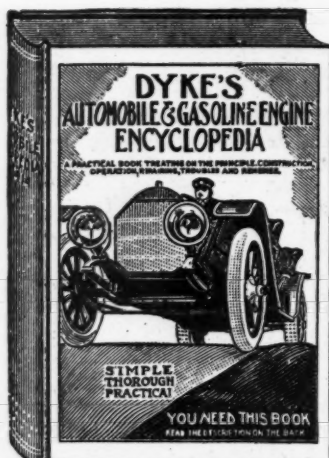
This is the kind of ignition that always has extra energy in reserve for the extra effort. It delivers a spark tempered exactly to the motor's requirements—a spark that grows more powerful as speed decreases—the kind of a spark that keeps your motor from faltering—in a word, an effective spark at all speeds. The more adverse the conditions, the better CONNECTICUT's spark.

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 & ELECTRIC

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(4)—Stationary Engines—gasoline, kerosene, oil—construction—operation—care—Diesel—gas producers—railroad motor cars.

(5)—Aero Engines, Air Crafts, Steam Engines (for automobiles); these subjects are only briefly treated, but the principle clearly explained. A submarine is also explained.

(6)—Digest of Troubles, Repairing—covering troubles, remedies and repairs of motorcycles, marine and stationary engines.

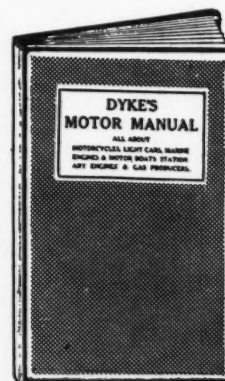


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What Have These to do with Starting and Lighting?

You can't make lasting concrete without proper ingredients. And you can't make a lasting battery plate without the proper oxides of lead.

The number of times you can start your motor and operate your lights depends upon the life of your battery plates.

Good oxides make longer-lived plates. Willard plates wear well and hold their charge better because of careful selection of these oxides. Coarse grained oxides hold together more firmly and make the plate durable. Chemical and physical tests are necessary to make the proper selection of oxides. These tests are expensive, but they result in longer and better service to the battery user.

Battery construction depends upon more than oxides alone, but the same care is exercised in every Willard operation and process, from raw materials to final assembly.

Ask your battery man to show you the comparison between Willard plates and cheap plates. Then you'll see why it pays to buy a Willard Battery in the first place.

Send for literature R-14. The free booklets "Truth Telling Tests" and "Your Storage Battery" contain information that may save you money and prevent annoyance.



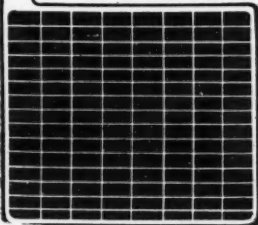
Willard Storage Battery Company Cleveland, Ohio

New York: 228-230 W. 58th St.
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Oakland, Cal.: 2509 Broadway

Direct Factory Representatives in Philadelphia, Boston, Dallas,
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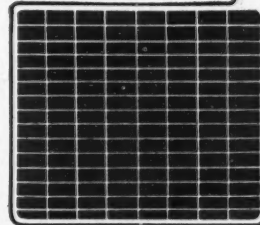
Coarse grains of crystalline oxides make Willard plates lasting. They do not disintegrate rapidly. That's why a Willard Battery lasts longer and retains a charge for a longer period.

Willard

STORAGE BATTERY

Service Stations in All Principal Cities in the
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Fine-grained oxides are cheaper, but a plate made with this kind will fall apart in a short time from the action of the acid. Does it pay to trust your lighting and starting satisfaction to a cheaply-made battery?

The Remedy



for "starter troubles," particularly during the cold season, is found in the

LUNKENHEIMER GASOLINE ENGINE PRIMER

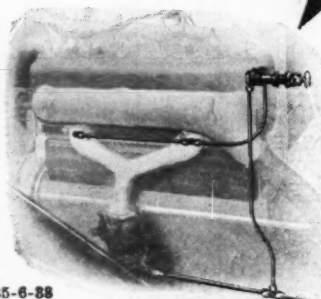
A stroke of the plunger gives that necessary gasified charge to the cylinders creating a power impulse on the first turnover.

Save

the starter battery and eliminate the tiresome and dangerous spinning of motor by hand.

Every car, regardless of make or price, should be equipped with one. Order from your dealer, or write us.

Descriptive booklet upon request



35-6-88

THE LUNKENHEIMER CO.
"QUALITY"

Largest Manufacturers of
High Grade Engineering Specialties
in the World

CINCINNATI

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Awarded MEDAL OF HONOR
Panama-Pacific International Ex-
position, San Francisco, and
GRAND PRIZE Panama-California
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The Automobile Catechism

Special Price, \$1.25

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"THE AUTOMOBILE CATECHISM" (de luxe edition) is a complete course in automobile instruction—each subject discussed and illustrated so that YOU will grasp every point worth while—every subject is made as simple as A B C. You are interested—you are instructed—you are directly benefited. Its information is final.

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SIMMS ^{High Tension} MAGNETO and SIMMS-HUFF Electric Starting and Lighting System

Automobile Engineers
unite in pronouncing
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AIR IS FREE—
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When the air in your tires
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sure you no longer are rid-
ing on air, but on rubber.

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UNIVERSAL TIRE
PRESSURE GAUGE

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—the choice of men who demand quality and efficiency.

Standard equipment on many of America's foremost cars.

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1415 East 40th Street

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Flexibility

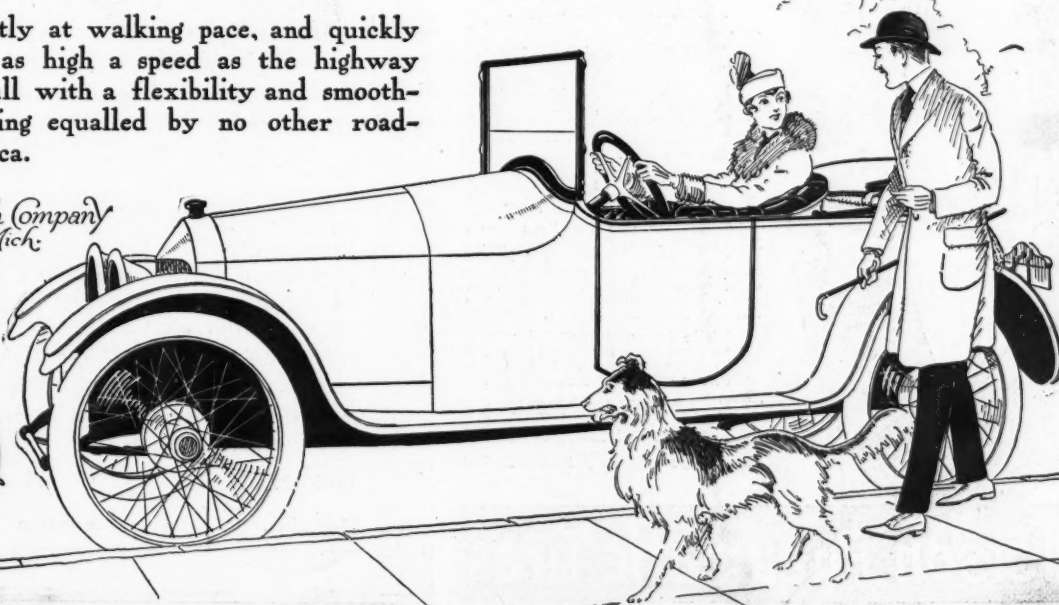
in a motor car is a combination of powerful but smooth running mechanism with ease of power control.

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cars run quietly at walking pace, and quickly accelerate to as high a speed as the highway will permit, all with a flexibility and smoothness of running equalled by no other roadster in America.

Scripps-Booth Company
Detroit Mich.

Roadster \$775
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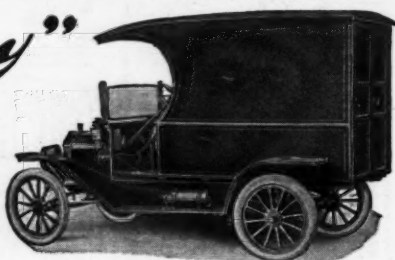


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Commercial Bodies

Will Fit Any Regular Ford Chassis



Your regular Ford Car may be easily converted into a delivery car by adding a **HENNEY COMMERCIAL BODY**. Simply lift the body onto the chassis and tighten only six bolts—body can be put on or taken off in a few minutes without the aid of a mechanic, as all Henney Bodies are shipped complete with all necessary bolts and will fit any regular Ford chassis.

Henney bodies are beautiful in design and built of the best grade of materials throughout.

We have a body suited for every need—general merchant, dry goods merchant, hardware dealer, grocer, plumber, florist, farmer and dairyman. Catalog describing HENNEY Bodies will be sent on request. Write us today for prices.

Henney Buggy Company
Freeport, Ill.



Dealers:—You will find ready sale for Henney Bodies. Will fit used chassis and help you turn over your stock quickly at a good profit. Ask us for special dealer's proposition. It's a money maker.

Guaranteed for 10,000 Miles



BRICTON Pneumatic Tires are guaranteed for 10,000 miles and under a specific 10,000 mile written service guarantee. What more can you ask of a tire? With Bricton Tires, punctures, blowouts and rim-cuts are eliminated—they are proof against ruts, oil and gasoline. Resilient and easy riding, too.

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Give Bricton Tires a free trial on your own car. Put them to test at our expense. Find out why Bricton Tires sales are increasing daily.

Your Tires Rebuilt the Bricton Way

If the fabric in the tires now on your car is in good condition, we can take them and make them proof against rim cutting, punctures, blowouts, sidewall breaks, skidding, ruts and oil and give you thousands of miles of additional service.

Write today for full information about Bricton Tires. Tire Rebuilding and details of our liberal Free Trial Offer.

THE BRICTON MFG. CO.

12-125 Bricton Bldg.,
Brookings South Dakota

Bricton Pneumatic Tires

CARRY YOUR LUGGAGE ON THE RUNNING BOARD

Don't scratch the inside of your car by carrying luggage in the tonneau, when a—



Durand Carrier

—on the running board holds 5 to 6 suit cases and quantities of robes, coats, etc. Securely fastened. Clean, dry and handy. Fits any car. Made with two or three upright arms, each fastened with two leather straps. Bolted to the running board. Luggage can't drop out.

Easily removed and replaced by adjusting thumb nuts. Adjustable to fit articles of any size and shape. An absolute necessity for touring. A valuable convenience about town.

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DURAND-FERRY MFG. CO.
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Thompson Self-Winding Electric Clock

"Never Needs Winding"

Reliable as Your Watch —and Handier

—and never runs down. It's flush on the dash, like your speedometer — and easier to read. Winds itself electrically, from storage battery or dry cells. Uses small current. Seth-Thomas Clock Co. movement. Absolutely guaranteed, to keep accurate time in all kinds of weather, under all conditions. Unaffected by vibration or rattle. Dust and water proof. Best time keeper for motor cars.

Price.....**\$12**

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THOMPSON ELECTRIC CLOCK COMPANY
Memphis, Tennessee



Almost any Magneto
can be sold to somebody
but when

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MAGNETOS

are adopted as standard equipment
by the great ignition experts of

108 Manufacturers

—the largest in the country—including

72 Trucks
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Tractors, Mining Machinery,
Stationary Engines, Gasoline
Locomotives, etc.

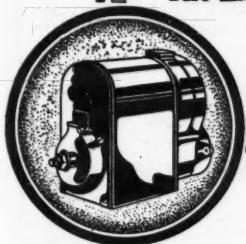
There Must Be a Reason!

The Eisemann Magneto Company

Sales and General Offices:

32-33rd Street, Brooklyn, N. Y.

New York, 245 West 55th Street
Indianapolis, Ind., 415-417 N. Capitol Ave.
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Your Car Starts Quick in Zero Weather

Engine goes on first or second turnover, if you have an Ieco Electric Manifold Plug. You don't have to waste a half hour trying to get started, wearing yourself out cranking a cold engine. You don't have to use up all your battery running the self starter until the engine goes. Ieco Plug puts a hot vaporized mixture into the cylinders and the engine goes at once.

The IECO Manifold Plug

Saves 25 % Fuel	Primes from Seat	Removes Carbon
Truck Owners	Detects Carburetor	Deposits
Save Money	Troubles	Economical and
		Easy to Install

GUARANTEE: The Ieco Manifold Plug is guaranteed for two years against burn out. Money will be refunded if not as claimed. Descriptive circular sent. If your dealer can't supply you, will send upon receipt of price. Complete with all attachments, ready to install \$5.00

(In Canada \$7.25)

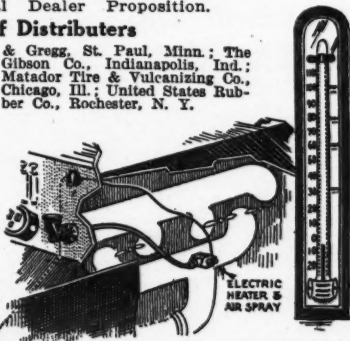
When ordering specify voltage of battery. Ford cars require six dry cells

Dealers: Big demand for this PLUG—Write for Special Dealer Proposition.

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INTERSTATE ELECTRIC CO.
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\$57.50

ANCHOR SEDAN TOP
on Ford Touring Car

Anchor Sedan Top Touring, \$57.50
Coupe Roadster, \$47.50

Winterize Your Ford Car

All the comfort of the most luxurious limousine at a cost that is wonderfully low. Our immense factory and facilities make possible these almost unbelievable prices. All windows and doors are glass (not celluloid). Beautiful lines and finish. Perfect fit. No overhang. No rattle. Windows removable in summer. Everything complete. No extras. Easily attached to regular body.

Write today for illustrations and complete details about these beautiful tops. Now is the time to get one.

COUPE
TOP



\$47.50

The Anchor Buggy Co.

Department M-A

CINCINNATI OHIO
DEALERS WANTED

EVERYWHERE. Prices and quality of the Anchor Sedan and Coupe Tops makes them the most attractive selling proposition on the market. Write for details. Ask your bank who we are.

MOTOR MICA Grease

—is the least expensive, most efficient lubricant. Used and heartily endorsed—with re-orders—by leading motor car manufacturers, and hundreds of satisfied motorists. Compounded with MOTOR MICA—the absolutely non-friction, non-caking lubricant. Treats the cause of friction, and overcomes it.

Adds 100% to Riding Ease

—when installed between the spring leaves of your car. Keeps them limber, prevents crystallization and prolongs spring life.

Fills up minute depressions in all rubbing surfaces and overlays new surface of symmetrical outlines. Gives degree of smoothness unattainable by highest gloss.

Sold on Money-Back Guarantee

Use the coupon now for one pound can of MOTOR MICA Grease, or convenient tube. No need to pay more than 20c for efficient lubrication. Order your MOTOR MICA Grease today.

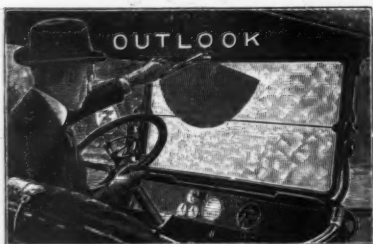
Special inducements to dealers, jobbers and garage-men. Mail the coupon now.

Motor Mica Mfg. Co.

1110 N. Clark St. Chicago

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Enclosed find 20c for 1 pound of MOTOR MICA GREASE, on satisfaction or money back basis.
Name.....
Address.....
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For driving safely when the windshield is up during the winter storms an

Outlook Cleaner

is absolutely needed. Any accident to yourself or car will cost you many times the price of the Cleaner.

Fits any windshield, attached in two minutes, black or nickel finish, cleans without leaving the seat. Equip your car TODAY, Safety First.

The Outlook Co.

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Big sellers, dealers and jobbers, write or wire

If your dealer can't supply you, send \$1.50, his name and receive this necessity postpaid. Money refunded if not satisfactory after 10 days' trial.

MAYO ELECTRIC GARAGE PUMP

Operated by $\frac{1}{4}$ h. p. electric motor, with silent chain drive. Water cooled. Automatic auxiliary tank air-pressure system. Portable. Complete with wire, separable attachment plug, tubing, accurate pressure gauge and tire valve connection, holders for wire and hose.

State current and voltage in ordering

Write for free folder and special discounts

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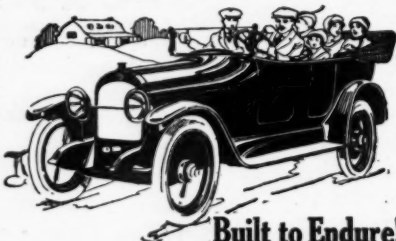


\$75

Westcott

1916—SIXES

Six-41—5 Pass. 41 H.P. Touring, \$1295
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Six-51—7 Pass. 51 H.P. Touring, \$1595
Six-51—5 Pass. 51 H.P. Roadster, \$1595
Demountable Sedan Top, Model 51 Touring, \$350 extra.
Six-41 Wheelbase 120 in.
Six-51 Wheelbase 126 in.
Six-41 Weight 2800 lbs.
Six-51 Weight 3000 lbs.



Built to Endure!

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MOSLER VESUVIUS PLUG

Price \$1.00 at All Dealers

Stone insulator. Absolutely gas-tight. Has no equal for power and Speed. Sizes and threads for all motors. New schedule of trade prices.

A.R.MOSLER & CO. New York. N. Y.

Powerful and indestructible as the fires of Vesuvius

Don't Set Your Carburetor by Guess

S & B Carburetor Adjuster

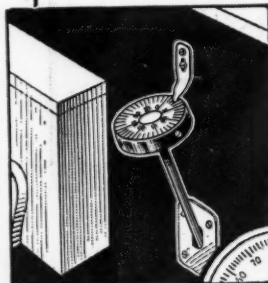
KEEPS IT RIGHT

SAVES FUEL

Graduated scale on dash tells you how to set your carburetor. Eliminates guess work. Insures accurate adjustment from driver's seat. Made of best grade steel, heavily nicked. Will not rust. Outlasts your car. Pays for itself in fuel saved. Price, 50c.

DEALERS, JOBBERS

Special discounts. Write Schoener Mfg. Co. Only 50c
St. Cloud, Minn.



WONDER-MIST

For Cleaning Automobile Bodies



Restores the car to its shipping-date appearance—adds new life to the varnish and makes it less susceptible of gathering dust than ever.

The Wonder-Mist Co.

General Offices.....14 Federal St., Boston, Mass.
New York Office.....1789 Broadway
Chicago Office.....162 No. Dearborn St.

HOLLIER

\$985 EIGHT \$985

"It leads the leaders"

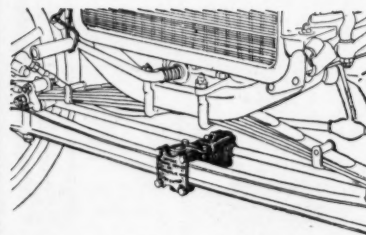
THE LEWIS SPRING & AXLE CO.

JACKSON, MICHIGAN

THE SAVIDGE DEVICE

Built Especially for Ford Cars

A simple, inexpensive device that makes winter travel in your Ford as smooth and even as a Pullman ride. Eliminates any possible danger from bad roads. Your car cannot "buckle under," making driving absolutely safe.



Ask the owner who uses one

SAVIDGE

Steering Device Co.
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The New MANZEL Single Cyl. Engine Driven Tire Pump

\$10.00

including fittings for installation on Buick, Chevrolet and Overland models.

\$12.00

including fittings required for installation on other cars.

Built upon the same principle—of the same high-grade materials and with the same exacting care as its predecessor

THE MANZEL Single Cylinder Tire Pump

offers the best value on the market for the motorist who desires a durable and efficient tire pump at a low price.

**The MANZEL
Engine Driven
2 Cyl. Tire Pump
Now \$15.00**

including gears, bracket, 15 feet of air hose, gauge, air filter, etc.

MANZEL BROTHERS COMPANY
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Why Waste Something You Need?

The waste heat from the exhaust of a motor car can be utilized to make you comfortable on these cold winter days. The

"Auto-Rad"

makes use of the wasted heat of the exhaust by carrying it into the tonneau (without any odor of gas or annoying trace of road dust).

It is an attractive enameled steel casing covering a specially designed radiator which disseminates a mild circulation of warm, clean air under the rugs and about the body.

Fits into an unused space, weighs but 4 pounds and becomes an integral part of the car itself.

Ford Model—Price \$6—Regular finish black enamel.

BREVANDO MFG. COMPANY
520 Arlington Bldg., Rochester, N. Y.

Electric Auto-Lite Starting—Lighting—Ignition

Electric Auto-Lite equipment for automobiles is as famous for the service that backs it as for the reliability and economy of its operation.

ELECTRIC AUTO-LITE COMPANY
Home Office and Factory: Toledo, Ohio
New York Detroit Kansas City San Francisco

The Unusual Present

SPARK  PLUG

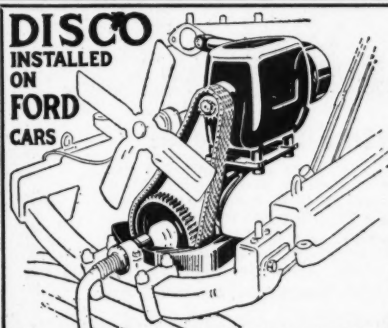
GIFT PACKAGE

Thousands of motorists and their friends who enjoyed, the past season, many a merry automobile outing, will take kindly to the **RED HEAD GIFT PACKAGE**

An Innovation in Appropriate Giving. Suitable to give during the holidays or on other special occasions.

Dealers, Order Now. Be prepared early to satisfy the demand that will come through our big National advertising campaign to over 5,000,000 readers.

EMIL GROSSMAN MFG. CO., Inc.
Model Factory No. 20, Bush Terminal, Brooklyn (New York City), N. Y.
1253 Michigan Ave., Chicago



ELECTRIC STARTING AND LIGHTING SYSTEM

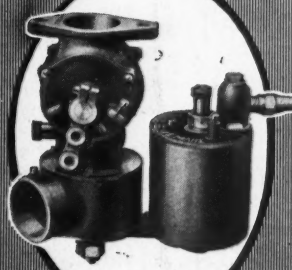
The Disco operates on a twelve-volt current and is absolutely the most powerful starter made for Ford cars. Single unit system, simple, light, reliable. Mounted on patent yoke bracket, which maintains

alignment and prevents chain troubles. The Disco SPINS the motor, insuring a start every time.

Dealers Write for Agency

DISCO ELECTRIC STARTER CORPORATION
Detroit, U. S. A.

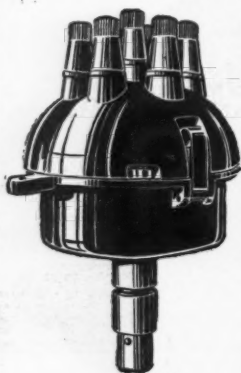
\$75
Complete



LONGUEMARE CARBURETOR

The Carburetor of the New School completely automatic without the use of springs, balls, cams or auxiliary valves

LONGUEMARE CARBURETOR CO
1876 BROADWAY NEW YORK



The Atwater Kent Ignition System

Used by one-quarter of all 1915 U. S. A. built cars, exclusive of Fords.

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PHILADELPHIA, PA.

Your Old Radiator Is Worth Money Applied on a New Majestic

Don't cast off the old radiator because it's served its time. It's still worth money to us, and *we'll take it as part payment* on an absolutely new, *guaranteed* MAJESTIC Square Tube Honeycomb Radiator.

Made for every make and model of car at lowest prices that will buy quality. Write for free illustrated circular today.

Our new wholesale bulletin on auto supplies, just off the press. Send for one.

Dealers Wanted

Majestic Mfg. and Specialties Co.
1355 South Michigan Ave., Chicago

Majestic Square Tube Radiator



THE RUTENBER MOTOR

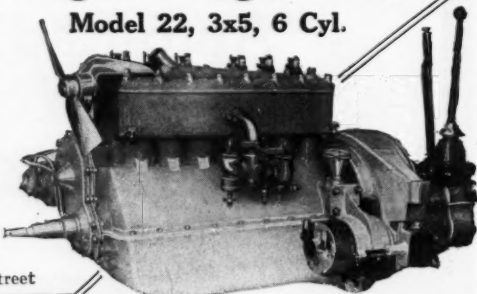
— combines the advantages of economy in first cost and up-keep, with quality construction and efficiency. The motor that never fails.

The Rutenber Motor Co.
Marion, Ind.

Chicago Office
10 S. La Salle Street

Used in America's Best Light Weight Cars

Model 22, 3x5, 6 Cyl.



More than half the motor cars you see are Ford cars. The reasons are plain because the Ford car has a record for efficient performance which speaks for itself.

Runabout \$390; Touring Car \$440; Town Car \$640
f. o. b. Detroit

THE FORD MOTOR COMPANY
Detroit, Michigan

Add to Garage Profits by Oxy - Acetylene Welding

Savings made please your patrons and pay good substantial profits.

PREST-O-LITE

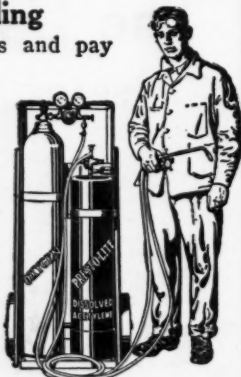
Dissolved Acetylene
(Ready-made carbide gas)

adds to the efficiency and usefulness of any good welding equipment. We furnish thoroughly high grade welding apparatus for \$60.00. The average user will also need gas cylinders at an additional cost, and about \$10.00 worth of welding supplies. Truck and special equipment for cutting operations at extra cost.

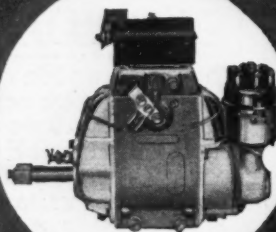
Send for details of Prest-O-Lite Service for Oxy-Acetylene Welding.

The Prest-O-Lite Co., Inc.
The World's Largest Makers of Dissolved Acetylene

233 Speedway Indianapolis, Ind.



DELCO



ELECTRIC
CRANKING
LIGHTING
IGNITION

THE DAYTON ENGINEERING
LABORATORIES CO.
DAYTON OHIO

The ALL-YEAR Car

Originated by Kissel

The Detachable Top idea in the ALL-YEAR Car was invented and first introduced by Kissel—open touring car in summer—closed coach in winter—easily attached or detached in your own garage.

Ask for literature. Touring Cars \$1050 to \$1750. Roadsters \$1150 to \$1650
ALL-YEAR Cars \$1450 to \$2100

Kissel Motor Car Co., 121 Kissel Ave., Hartford, Wis.

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EVERY INCH A CAR

WINTON SIX

To the family accustomed to touring cars, the closed car offers the only remaining new delight in motor car enjoyment. Also it contributes to their sense of well-being, and is, accordingly, the most gratifying contribution you can make to those you hold dear.

Prices are unusually attractive. Write for catalog today.

THE WINTON COMPANY
424 Berea Road, Cleveland, Ohio
World's First Maker of Sixes Exclusively



Stores, Measures and Pumps Your Grease

Keep your transmission greases in a clean place, and deliver them to the parts of your car as needed, simply operate the pump.

Runyen's Grease Cabinet—\$7

—Is a convenient container and pump. Operates six times as fast as you can work by hand. Eliminates waste. Made in four sizes. Write for free circular.
Dealers—Big sales. Liberal discounts. No. 75—75 lbs. capacity. Saves money in garages and factories. Write for yours today.
Size No. 2, Capacity, 15 lbs.
List, \$7.00.

RUNYEN MFG. COMPANY
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WARNER AUTO COVERS

FIT LIKE A GLOVE
DUST-PROOF WEAR-PROOF

For samples, prices and catalog,
ADDRESS

THE WARNER AUTO-TOP COMPANY
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Supreme Auto Oils

Flow Freely at Zero

This permits the use of medium instead of light oil during the winter months, and affords better lubrication.

Any dealer displaying the Sign of the Orange Disc will supply SUPREME AUTO OIL.

There is More Power in
**THAT GOOD GULF GASOLINE and
SUPREME AUTO OIL**

GULF REFINING COMPANY
Dept. 1875 Frick Annex Pittsburgh, Pa.

MIDGLEY PATENTED Wire Tread TIRES

Plain and Non-Skid
also Inner Tubes

*Unexcelled—Write for
Complete Information*

The Midgley Tire & Rubber Co.
Dept. 11, Lancaster, Ohio

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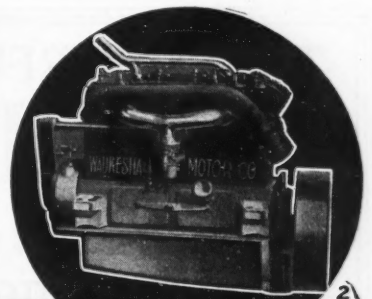
"The Exceptional" MOTOR

Meets every condition of efficient truck service. Heavy duty without excess weight. Surplus strength and power, yet compact.

Ask for catalog M, which gives full details

Waukesha Motor Co.

221 Factory St. U. S. A.
Waukesha, Wis.



Waukesha **TRUCK MOTOR**
TRADE-MARK REG.

Detroit

Tested the Highest

Tests by an engineering expert from the University of Michigan showed the Detroit Battery

First in capacity
First in capacity for the weight
First in durability

There is a Detroit Battery made for every car and starter. Dealers can supply any car in their community. List prices reduced 50 per cent and are net.

Write for dealer's proposition.

DETROIT BATTERY COMPANY
DETROIT, MICHIGAN

Steel Protectors

Each section 2" wide 1/8" thick. They hook to rim. As flexible as ever. Anti-skid, can't blow out or rim cut.

HOW CAN THE RUBBER WEAR OFF IF IT IS COVERED WITH STEEL?

Try 2 or 3 sections over any old blowout

Special prices to the first in new territory

Kimball Tire Case Co. 173 Bdwy, Council Bluffs, Ia.

Tire covered complete

Moline-Knight "40"

F. O. B. **\$1375** Factory

40 horsepower, 5 passenger touring and 2 passenger roadster, 118-inch wheel base, 34x4-inch tires (non-skid rears), spiral bevel gear rear axle, weighs 2,896 pounds ready for the road, Auto-Light starter, high tension ignition, complete equipment, 50 horsepower touring, roadster, sedan, limousine models—\$2,500 to \$3,800.

Moline Automobile Co., East Moline, Ill.

JUMBO SPARK PLUGS

Jumbo
Jiant
\$1.25

Jumbo
Regular
\$1.00

Jumbo
Junior
\$0.75

Jumbo
Special for Fords
\$0.75

Gibson-Hollister Mfg. Co.

3380 WASHINGTON ST.

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BOSTON, MASS.



A greater sum of the essentials to unflinching service and complete satisfaction will be found in VIKING design and construction, than in any other plug at any price.

Buy VIKING PLUGS as an insurance of service

Price \$1.00 each—all styles

THE JOHN MAC GREGOR COMPANY, INC.
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DOUBLE SEAL TIRE VALVE



No tool needed to seat or remove Valve

Interchangeable with All Stems

Fifty Cents Per Dozen
Single Valves, Five Cents



Actual Size

Double Seal Tire Valve Company
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THE POWERFUL, SILENT SPHINX

Model B-16 \$640

A REAL AUTOMOBILE

The lightest, strongest, most serviceable and economical machine of its kind ever built.

112 inch wheel base. Electrically started and lighted.

Sphinx Motor Car Company, York, Pa.

CARSRING TIRES

BEST UNDER A CAR BEST ON EARTH

Will establish you in business on a permanent and profitable basis.

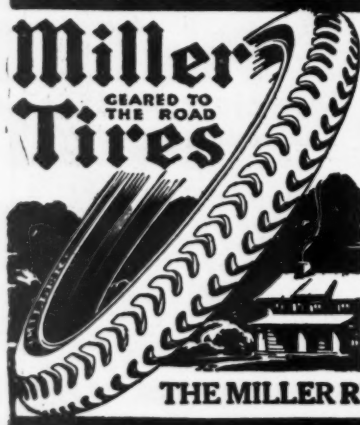
Our Policy:

One good dealer in each territory, backed by the best goods and unlimited co-operation.

New Jersey Car Spring & Rubber Company
Jersey City, New Jersey



Carspring Tires are permanently non-skid.



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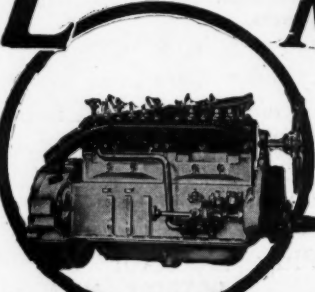


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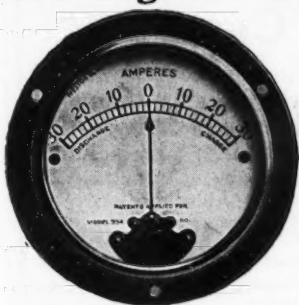
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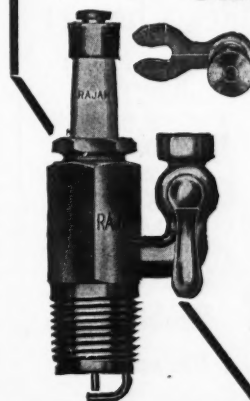
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Buick 26-27..... 25.00	Buick 35..... 19.00
Buick 36C..... 21.00	Buick 38-39..... 27.00
Buick F 1906-10..... 25.50	Buick D..... 25.00
Cadillac 1909-10..... 27.00	Cadillac 1911-12..... 28.00
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Paige 25..... 26.50	Regal S..... 27.00
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We have just opened our new factory equipped with the latest machinery for high class work. Prompt service. Low prices. Write for prices on special work.

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100% Cooling Efficiency

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ONLY RADIATOR FACTORY IN NORTHWEST

Pioneer manufacturer. Why send your radiator down east when you can ship it to us, save time, expense, freight, money and get best workmanship? Prices right. Make new radiators, allow for old one.

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for any make of car

Frozen and Burst Radiator Repairing

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Largest plant in the West to repair, rebuild or manufacture

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AAA SCORED CYLINDER

Repaired by patented electric process. Filled with silver and nickel composition. Same pistons and rings used. No warping or enlarging of cylinder bore. **L. LAWRENCE & CO.**, 292 Halsey St., Newark, N. J.

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LIGHT-WEIGHT ALLOY

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For any make motor. Light weight pistons the great improvement in motor building. Cylinder regrounding, light Semi-Cast Iron or standard cast iron pistons.

We Do Quality Work

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Either cast iron pistons and rings or our special light alloy pistons and rings furnished. State make of car in writing.

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NEW PISTONS—RINGS—WRIST PINS

MORE POWER—LESS COST

Scored or Worn Cylinders Made Like New Special Attention Given Out-of-town Orders.

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Special Light Alloy Pistons

Our special facilities enable us to do highest grade work. Over 225 piston patterns.

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Fitted with light cast iron pistons and McCadden leakless rings, new pins, bronze bushing. Weight of Buick 10, 1 1/4 pounds, Ford, 1 1/4 pounds, Hudson 33, 2 1/4 pounds. Absence of vibration, quiet, smooth. Any make car.

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Fitted with my heat treated light weight pistons and patented three section rings.

From \$6 to \$15 per Cylinder
Ford cylinders reground, fitted with new piston rings, wrist pins and bushings for \$20.00.

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Including new pistons and rings, \$7 to \$11 per cylinder. General overhauling and repairing. Welding, Cylinders, Crank Cases and Crank Shafts welded.

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Including New Pistons and Rings.
All makes \$6.00 per cylinder. Write.

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at ridiculously low prices

1 cyl.....	\$15.00
2 cyl.....	20.00
4 cyl.....	30.00

Prices include new piston and rings.

Work Guaranteed.

Money refunded if not satisfactory.

Work Promptly Done.

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and fitted with Special Composition heat-treated rings and heat-treated pistons, \$7.00 to \$15.00 per cylinder. Ford cylinders reground and fitted with Standard weight pistons, \$18.00. Special light pistons, \$24.00. Oxy-Acetylene Welding.

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Including new pistons and rings for \$5 to \$11 per cylinder. Our special equipment enables us to do the highest grade of work at these prices. Light aluminum alloy pistons furnished at \$2 to \$4 per cylinder extra.
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ASK US HOW

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Ford Cylinders Rebored \$15.75

For complete job, including new pistons, rings and pins.

We Pay Freight One Way
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Extra light reciprocating parts and accurate cylinder grinding my specialty.

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That enable you to carry a gallon more oil in your crankcase. We positively guarantee oil will not seep your spark plugs. Cylinders reground. Pistons made and fitted. General machine shop work.
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REBORING OF CYLINDERS, furnishing new pistons and rings at lowest possible prices.
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The Clearing House—continued.

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\$5.00 AUTO ROBES, \$2.98

These robes are great, large "72" robes, made of heavy woolen material and make a very warm and good looking robe. They come in brown, blue and checkered. We sell them at only \$2.98.

Order of the store nearest you.

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\$2.00 SPARK PLUGS, 75 Cents MOSLER PRIMING PLUGS

Just the thing to make cold weather starting easy. Order today. Only limited quantity on hand.

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ANNUAL TIRE SALE

In Standard Guaranteed and Used Tires
Size. Used. New. Size. Used. New.
30x3...\$4.50 \$ 6.00 34x4...\$ 8.00 \$12.00
30x3½... 6.00 7.80 34x4½... 10.00 17.60
32x3½... 6.00 7.00 36x4½... 10.00 17.90
33x4... 9.00 11.85 37x5... 12.00 21.00
10% deposit with order, balance C.O.D. subject to examination.

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200 32x3½ Straight Side Plain Tread...\$6.75 ea.

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Under same management

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Size. Tires. Tubes. Size. Tires. Tubes.
32x3½...\$5.50 \$1.50 35x4½...\$ 9.50 \$2.25
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We require \$1.00 deposit on all mail orders to defray express charges. All shipments sent promptly C. O. D., subject to inspection.

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DOUBLE SERVICE TIRES

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Our Double Tread Tires

Are made from the highest grade of material, and will give you double mileage for half the price.

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30x3½... 6.00 33x4... 8.00
32x3½... 7.00 34x4... 9.00
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Add 10% for non-skids. One dollar deposit required on all mail orders shipped subject to examination.

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OUR PRICES THE BEST

3000 TO 5000 MILES FROM OLD TIRES

Size.	Cus- tomer	If we furnish- ing nish	If we furnish- ing nish	Size.	Cus- tomer	If we furnish- ing nish	If we furnish- ing nish
28x3...	both	one	both	32x4½...	both	one	both
30x3...	both	one	both	32x4½...	both	one	both
30x3½...	both	one	both	32x4½...	both	one	both
31x3½...	both	one	both	32x4½...	both	one	both
32x3½...	both	one	both	32x4½...	both	one	both
34x3½...	both	one	both	32x4½...	both	one	both
30x4...	both	one	both	32x4½...	both	one	both
31x4...	both	one	both	32x4½...	both	one	both
32x4...	both	one	both	32x4½...	both	one	both
33x4...	both	one	both	32x4½...	both	one	both
34x4...	both	one	both	32x4½...	both	one	both

Small additional charge for vulcanizing. Send tires prepaid with owner's name and address. We return them by express, charges collect. Non-skid or plain treads, your choice for outer.

DOUBLE MILEAGE TIRE CO., INC.

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Protect Your Inner Tubes

WITH

Hampton's Inner Liner

when you Double Tread your tires. This liner, made of two pieces of highest grade tire fabric with a layer of chrome leather vulcanized between, keeps the heavy stitching, used to Double Tread your tires, from cutting or puncturing your inner tube.

PREVENTS BLOW-OUTS

Write for our price list and pamphlet explaining the Right Principle.

HAMPTON-CAMPBELL CO.

501-503 No. Illinois

Indianapolis, Ind.

TIRES

WE SELL

Akron Tires

Everybody knows what AKRON TIRES are—they have used them for years. No argument necessary.

Largest Stock; Lowest Prices

Size	Plain	Tubes	Size	Plain	Tubes
28x3...	\$5.00	\$1.80	34x4...	\$9.00	\$3.20
30x3...	5.00	1.90	35x4...	10.00	3.30
30x3½...	6.50	2.15	36x4...	10.00	3.35
32x3½...	7.50	2.25	34x4½...	12.00	4.00
34x3½...	8.00	2.35	35x4½...	12.50	4.10
31x4...	8.75	2.95	36x4½...	13.50	4.15
32x4...	8.50	3.05	37x4½...	14.00	4.25
32x4...	9.00	3.10	36x5...	15.00	4.95
			37x5...	16.00	5.05

Non-Skids \$1.00 Extra; All Sizes

In orders of four or more tires where cash accompanies order in full we pay transportation charges. For less in number we agree to pay one-half of charges.

10% required on C. O. D. orders

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Authorized Capital, \$300,000.00

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SAVE MONEY

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WILCOX BROS.

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Tires Tubes

All Fresh Selected Stocks—

Standard Firsts

The quality and service feature in these tires and tubes are the same as featured in the tires you are now paying high prices for. The following price list buys quality goods:

Size	Tires	Tubes
28x3	\$ 5.50	\$1.25
30x3	6.00	1.85
30x3½	7.50	2.10
31x3½	8.00	2.25
32x3½	8.50	2.25
34x3½	9.00	2.80
36x3½	10.25	2.50
31x4	11.50	2.80
32x4	12.00	3.00
33x4	12.25	3.05
34x4	12.75	3.15
35x4	13.00	3.25
36x4	13.50	3.30
34x4½	15.75	3.80
35x4½	16.50	4.00
36x4½	17.00	4.10
37x4½	17.50	4.15
36x5	18.00	4.80
37x5	19.50	5.00

FOR NON-SKIDS ADD 10% TO

ABOVE PRICES

We also have 500 slightly used and demonstrating tires and tubes, all sizes that are positively guaranteed which we are closing out in this sale.

Size	Tires	Tubes
30x3	\$ 3.00	\$1.25
30x3½	3.75	1.35
31x3½	4.25	1.40
32x3½	4.50	1.40
34x3½	5.00	1.50
31x4	4.25	1.40
32x4	6.00	1.50
33x4	6.25	1.50
34x4	6.75	1.60
35x4	7.00	1.75
36x4	7.00	1.75
34x4½	7.25	1.75
35x4½	7.50	1.80
36x4½	7.50	1.85
37x4½	8.00	1.90
36x5	8.25	1.90
37x5	8.50	2.00

All goods shipped C. O. D. subject to examination on receipt of 10% of order.

All shipments made promptly. To avoid delay, kindly mention style of your rim when ordering tires, as we have them in straight side, clincher and Q. D. clincher.

Tire Repair & Supply Co.

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RECLAIMED TIRES

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By Sending Us 2 Old Tires

We take two tires, one which is road-worn, but has good beads, and another which is rim-cut but has good tread and lock the side walls by our own special process, making a double tread tire good for thousands of miles.

PUNCTURE-PROOF and WATER-PROOF

Our Special Process Stays

We ship C. O. D. subject to examination at the following prices:

Size	Both Casings	33x4	35x4	34x4	36x4	34x4½	36x4½
30x3	\$2.75	37x4½	35x5	5.00	32x8½	3.00	38x4½
32x3	2.75	38x4	35x4½	5.25	34x3½	3.25	40x4½
30x3½	3.00	36x5	5.50	36x3½	30x4	3.50	36x5
32x3½	3.00	38x4½	5.50	31x4	32x4	3.75	

Small additional charges when inner shoes are required. Send us your old tires.

THE GEORGE R. CARTER CO.

Connersville, Indiana

The Clearing House—continued.

YOUR OLD TIRES

Good for 3,000 to 5,000 Miles
Our "Two-in-One" process makes two of your old tires good for several thousand miles, at a cost of from \$2.50 to \$5.00 (according to size). If we furnish one tire the cost is \$3.50 to \$7.00. Our process is different—no sewing or half-soleing—two tires **VULCANIZED** together. Send no money, but two old tires for a trial.
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We absolutely guarantee all work done by the **OXWELD PROCESS** of welding and cutting, including welding cracked or defective cylinders, cranks, housings, aluminum crank and transmission cases, etc., etc. Estimates furnished on job and contract welding and cutting of all kinds.

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High Temperatures Cost Money
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Cracked Cylinders a Specialty
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Prompt Service—Prices Reasonable—Work Guaranteed. Automobile Stamping and Sheet Metal Work. Special Welding Compounds for Sale. **WM. GREEN MFG. & WELDING CO.**
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We Do a Class of Finished Welding

on Crank Cases. Cylinders and other parts not equalled by concerns west of Chicago. It is seldom a job shows where we make an Oxy-Acetylene Weld. Parts are machined to their original shape and painted.

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WE WELD CYLINDERS, CRANK CASES, GEAR CASES. Also weld and straighten Auto Frames, Blacksmithing, Leaf Springs, etc. All Our Work Guaranteed.
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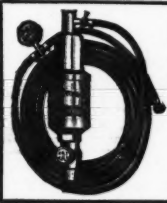
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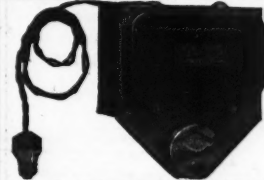
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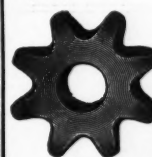
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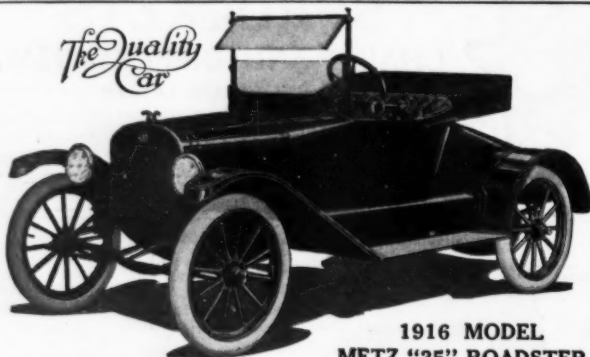
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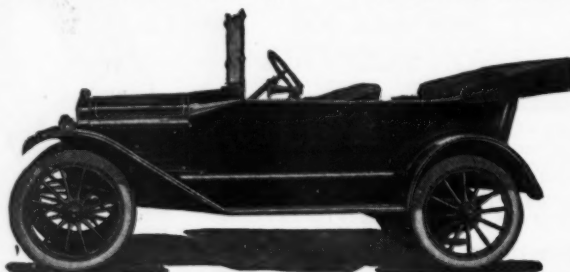
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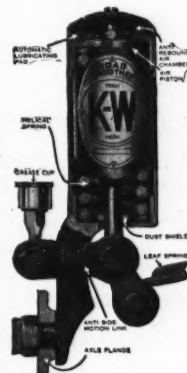
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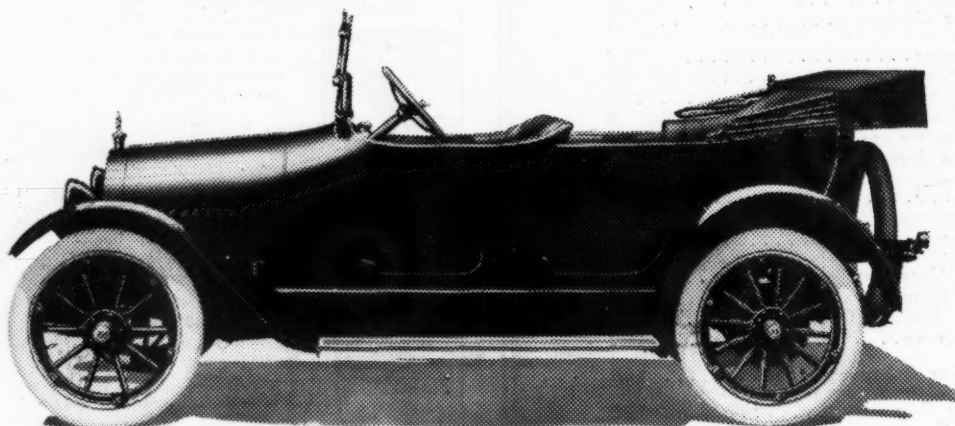
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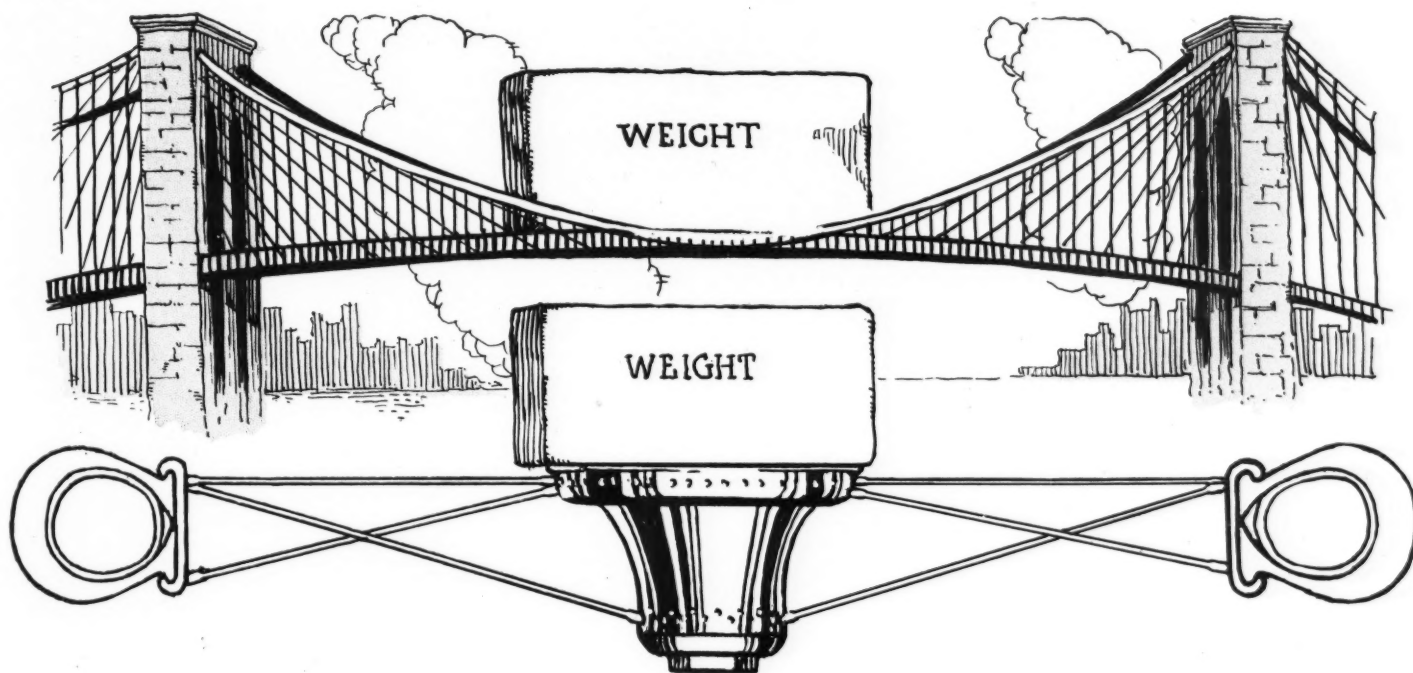
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